AMERICAN FRUIT GROWER MAGAZINE

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March, 1930
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American Fruit Grower
MAGAZINE
The National Fruit Journal of America

VOLUME 50 — NUMBER 3

The "Reed-Jones Bill" Would Aid the Commercial Fruit Industry

NO FEDERAL LEGISLATION has been proposed in recent years which promises more effective aid to the fruit industry than the Preserved Fruit Standards Bill, H. R. 6805, introduced in the House by Congressman Daniel A. Reed of New York State and in the Senate by Senator Wesley L. Jones of Washington.

This is the opinion of prominent fruit growers and of farm leaders who have given the matter consideration. It is in line with the fight which the dairy organizations and other agricultural groups are making to drive from the market substitutes and imitations which come into direct and highly injurious competition with farm products.

THE REED-JONES BILL defines fruit preserves, jams and jellies, providing standards thereof under the food and drugs act which have been approved by the fruit preserving as well as the fruit growing industries. All preserves, jellies and jams that fall below the established standard in fruit content will be classified as imitation products, and shall be deemed misbranded if they are not conspicuously labeled as "imitation" and the name of the ingredients of which they are composed plainly stated upon the label in the order of their predominance by weight in the product.

The outstanding object of this bill is to enlarge the demand for fruits that enter into the composition of jellies, jams and preserves by replacing the enormous production of imitation preserves, jams and jellies with a high quality pure fruit product.

FULLY 60 PER CENT of the tonnage of jams, jellies and preserves now on the market are substandard products, deficient in fruit. These imitation products, packed in containers identically like those used for the pure product, and sold in the stores as pure preserves, jams and jellies, contain 21 pounds of fruit to the 100 pounds as compared with 53 pounds of fruit contained in 100 pounds of pure preserves, jellies and jams.

The cost of the containers for a case of 24 one-pound jars is $1.10 for both standard pure preserves and imitations sold for preserves. The cost of labor is 25 cents and sugar 97 cents for each. The cost of the fruit, however, in the 24 one-pound jars of standard pure preserves, according to a recent investigation, was found to be $1.33, while the cost of fruit in the 24 jars of the imitation product was 53 cents. This clearly indicates that the difference in cost of the pure and imitation preserves, jams and jellies is due to the smaller quantity of fruit used in preparing the latter. The entire saving in cost is at the fruit grower's expense.

THE FRUIT GROWER not only loses a vast market for his fruit because of the substitution of imitation for the pure product, but, owing to the inferior quality, the demand is greatly curtailed. In proof of the assertion that the demand for jellies, jams and preserves would be greatly enlarged if it were not for the poor quality imitation products flooding the market, is the fact that in Great Britain, where imitation products are outlawed, eight times as much jams, jellies and preserves are consumed per capita as in the United States.

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This law would prove of inestimable benefit to the raspberry growers of Oregon and Washington; the cherry growers of Michigan, Colorado, New York and Wisconsin; the strawberry growers of Arkansas, Missouri, Tennessee, Maryland, Virginia, the Carolinas, Oregon and Washington; the peach and small fruit growers of Michigan, New York and Georgia; and the fruit industry generally throughout the United States.

In Washington, Oregon and other States it is the practice for the first picking of berries to be sent to the fresh fruit market. One-half of the second picking goes to the preservers and a large part or all of the third picking goes to the preservers. In the commercial strawberry producing areas, the berries are laid down in sugar, then frozen solid, and shipped to large preserving plants. The possibilities for development of the small fruits industry under this system of preparation and shipment, even in remote areas, if the Reed bill becomes a law, are very great.

THE UNITED STATES Department of Agriculture is strongly supporting the Reed bill. In a letter to Representative Reed, Secretary of Agriculture Hyde says the Department of Agriculture believes that enactment of the preserved fruit standards bill will afford a degree of protection to the public that is impracticable under the present terms of the food and drugs act. "While we have no available statistics on the relative proportions of the various jam and jelly-like substances on the American market," says Secretary Hyde, "we believe that more than half of the total production of these articles is below the department's standards in fruit content, particularly in the case of jam and preserves. The sale of these substandard articles we believe to be generally uneconomic. Certainly they reduce materially the amount of fruit which would be consumed if a larger proportion of the products on the market were of standard fruit content."

THE REED-JONES BILL, requiring honest labeling of preserves, jams and jellies, provides a plan of farm relief which will be effective in enlarging the market for such fruits as peaches, cherries, berries and grapes. The large preserving companies are said to be waiting only for the enactment of this bill into law before making arrangements to secure larger supplies of fruit which will enable them to confine their production to the pure products. It is believed that its prompt enactment by Congress this session would prove a very helpful and timely stimulant to the fruit industry the coming season.

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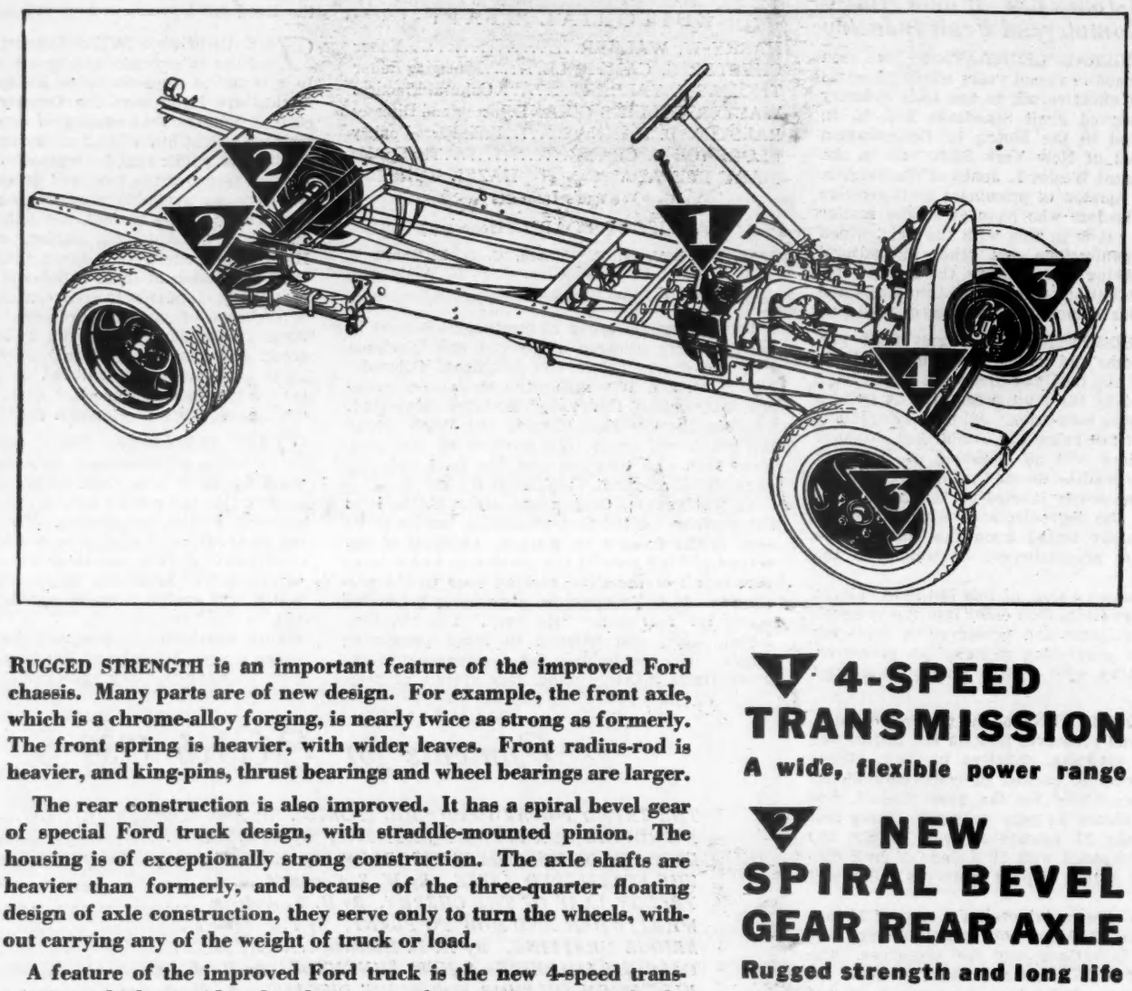
ANNOUNCING NEW FEATURES OF THE FORD TRUCK



RUGGED STRENGTH is an important feature of the improved Ford chassis. Many parts are of new design. For example, the front axle, which is a chrome-alloy forging, is nearly twice as strong as formerly. The front spring is heavier, with wider leaves. Front radius-rod is heavier, and king-pins, thrust bearings and wheel bearings are larger.

The rear construction is also improved. It has a spiral bevel gear of special Ford truck design, with straddle-mounted pinion. The housing is of exceptionally strong construction. The axle shafts are heavier than formerly, and because of the three-quarter floating design of axle construction, they serve only to turn the wheels, without carrying any of the weight of truck or load.

A feature of the improved Ford truck is the new 4-speed transmission, which provides abundant power for moving capacity loads, and ample speed where time saved is an important factor.

Brakes on the front wheels have been enlarged to the same size as those on the rear wheels, providing increased braking area and a high degree of safety.

The four-cylinder engine of the Ford truck develops 40 horsepower at moderate speed. This means that nearly its full power becomes available without the need for excessive speed. Especially important to the reliability of the engine is the simplicity of the electrical, ignition, cooling, lubrication and fuel systems.

Other chassis features, many of which are unusual in a truck of such low price, are the cantilever rear springs; the torque-tube drive; and the dual rear wheels at small additional cost, making possible the use of balloon tires the same size throughout, so that all six steel disc wheels and tires are interchangeable all around.

You can inspect the improved Ford truck, today, at the showroom of your Ford dealer.

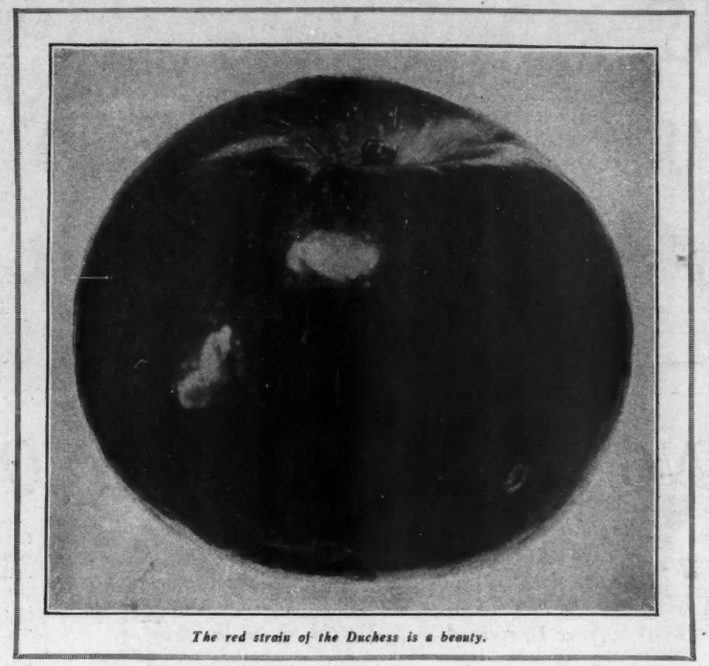
1 4-SPEED TRANSMISSION
A wide, flexible power range

2 NEW SPIRAL BEVEL GEAR REAR AXLE
Rugged strength and long life

3 LARGER BRAKES
Providing a greater degree of safety

4 NEW FRONT AXLE AND SPRING
Front construction unusually sturdy

Ford



The red strain of the Duchess is a beauty.

THE TREND TOWARD RED "BUD SPORTS"

The Value of Redder Strains of Apples Is Largely Based on the Fact That Most Buyers Demand That a Red Apple Be Red, and They Pay Accordingly. But There Are Other, More Far Reaching Advantages.

By JOHN T. BREGGER

Washington State College

A GREAT DEAL of interest is being taken at the present time by fruit growers, shippers and consumers in certain red strains or bud sports of several of our apple varieties. This subject of bud sports is not entirely a new one, however, but during the last few years a great deal of new interest has been shown in the subject.

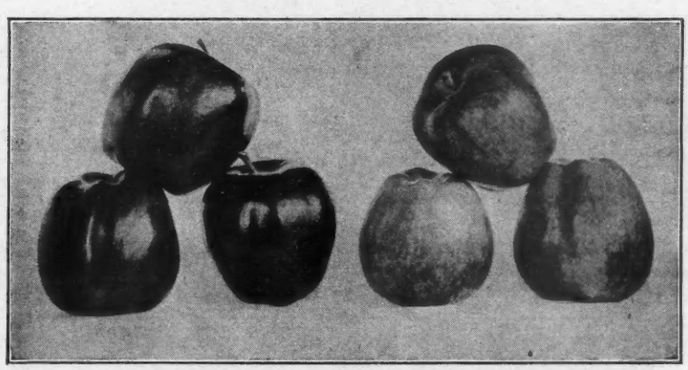
Because of the great amount of advertising which has been done in connection with the most important bud sports or red strains of apples which are now on the market, the public in general is rapidly becoming quite educated as to what these strains are and the advantages which are to be gained by their introductions into the newly planted commercial orchards. With this increased familiarity on the subject, more red strains and bud sports are being found until at the present time we have records of many hundreds. Of course, it may be desirable to propagate only the best of these strains, but the other type of bud sport is equally interesting from the scientific and research point of view.

Bud Sports Ordinarily Inferior

THE history of our knowledge of bud sports is very fascinating. Owing to the fact that most bud sports are inferior rather than superior to the variety from which they sprang, such new strains were, in the past, considered more as freaks than as anything else. It was their presence, however, that caused the grower of citrus fruits, for instance, to select for his new orchards such trees as had been propagated from buds on perfectly normal branches or trees. This has been true of the orange, lemon and grapefruit, and in fact is now the common and accepted practice.

Degenerate sport strains in the strawberry were discovered many years ago, but it is only during the last few years that any great attention has been given to weeding out these strains and selecting the most superior strain from which plants can be propagated and sold for the new plantings. In Washington, for instance, State certification is now being practiced to accomplish and standardize this selection work.

The nectarine, which is ordinarily considered nothing but a fuzzless peach, is actually a bud sport of the peach, showing this one essential change of character. Among other stone fruits, several bud sports have been found. In the sour cherry there is one interesting type which is a late blooming strain. In the sweet cherry, one unique strain is degenerate to the extent that it is absolutely barren. Another strain of the sweet cherry is striped instead of solid red. Several bud sports of plums and prunes have been noted. When we turn to the apple we can perhaps go into greater detail in showing just what has taken place in the matter of bud sports and the importance that we may attach to such new strains from a commercial standpoint. The type of sport that we are most interested in commercially is, of course, the color sport, and incidentally it pertains to varieties which are already red and in which the bud sport has additional color. It is very interesting to know that there are several red bud sports of the apple which are not of recent origin, some of these having been planted for a great many years. For instance, there are two red strains of the old Ben Davis—one called Gano and the other Black Ben. Another variety known for a great many years to be a red bud sport is the Red Gravenstein. In more recent years there have been other red strains of this variety which have come to light, one of the most interesting being the Crimson Gravenstein of Nova Scotia. This apple is a red bud sport of the Banks Red Gravenstein—in other words, a bud sport of a bud sport.



Showing the increased color on a red strain of Delicious in comparison with ordinary Delicious. This additional color is particularly noticeable in August or September, during the period of early coloring.

Red Strain in Delicious Arouses Enthusiasm

IT WAS not until the first discovery of a red strain in the Delicious apple that this subject of red strains became of such widespread interest among those connected with fruit growing. Within a comparatively short time trees of two red strains of the Delicious apple appeared on the market, having originated in two widely separated parts of the country. These two red strains have been named the "Starking" and the "Richared" Delicious. At the present time both varieties have begun to reach commercial production—particularly in the Northwest, where the Delicious is so widely planted.

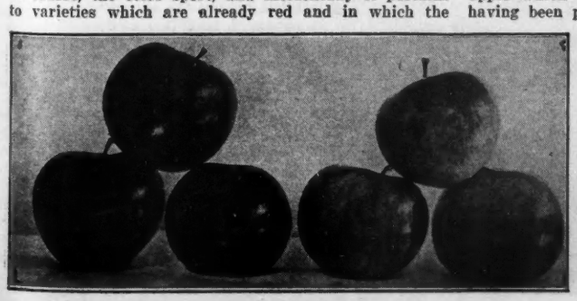
Since the introduction of the two red strains of the Delicious just named, several others have been discovered in other orchards and in several other parts of the country. Some of these have originated as a single limb in a tree of the ordinary Delicious, while others have originated as a whole tree. Of course, in the latter case it is safe to assume that the real or true origin occurred one or more bud generations back and was propagated without the knowledge of the nurseryman who sold the trees. With perhaps one or two exceptions there have been more red strains of Delicious found than of any other apple variety.

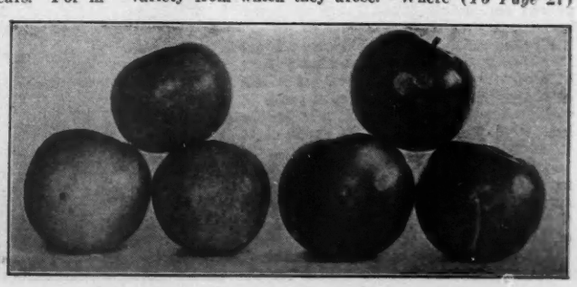
The Red Rome Beauty is probably the second most important commercial variety which has become well known as a red strain, although there are several others which might compete for this position, such as McIntosh and Stayman Winesap. Of the varieties just named, several red strains or bud sports are known, and these too have originated in more than one section of the country.

In addition to the apple varieties so far mentioned, we may add the Winesap, Northern Spy, Duchess, Spitzenburg and Baldwin as varieties in which a new red strain is showing some promise of becoming commercially important. In all there are over 15 well known apple varieties which have "thrown" red color sports which seem to be superior to the old or ordinary strain of each variety.

With the finding of so many red strains in the apple, it is very evident that some of them are not going to be as good as others. In fact this has already been observed. It is, therefore, very important that the orchardists who buy trees know as nearly as is possible the source of each strain they buy.

Through our knowledge of bud sports in the past it has been observed that a greater majority of these sports show inferiority rather than superiority to the variety from which they arose. Where (*To Page* 27)





Left. *The Red Rome Beauty, a well known bud sport or red strain which is now becoming a factor in commercial apple growing.*

Right. *Red strains have also been found in the Gravenstein, Spy, Baldwin and McIntosh. In the picture at left the Red McIntosh is shown in comparison with the ordinary strain. Picture of Red Staymen or "Staymared" will be found elsewhere in this issue*

Left.—Spraying with two of the four-nozzle heads on a machine with pump capacity of 20 gallons per minute. Right—Spraying with a four and three-nozzle head on a machine of 15 gallons per minute capacity.

Above.—The four-nozzle head measures 10 inches from center to center of outside nozzles; the three nozzle head measures seven inches.

IMPROVING OUR SPRAY EQUIPMENT

Rapid, Complete Coverage Is Necessary if the Foliage Sprays Are to Give Maximum Protection. Higher Powered Engines and Pumps of Greater Capacity Are Needed in Commercial Orchards. The New Nozzle Here Described Steps Up the Speed in Spraying.

By W. S. HOUGH

Virginia Agricultural Experiment Station

FIFTY YEARS ago a grower of fruits had little but faith and fertilizer to aid him in producing a clean and profitable crop. Controlling the insect enemies and diseases of the orchard are now considered an essential part of the "works" in a horticultural interpretation of an old and familiar phrase, "Faith will remove mountains, but without works it availeth nothing." In these latter days, we know that grief has come to more than one orchardist who planted in faith but through indifference or misfortune neglected the "works" of spraying. The evolution of spray equipment in modern orcharding is illustrated in Governor Byrd's orchards at Winchester, Va. Ten years ago compressed air sprayers and power sprayers with three horsepower engines were used exclusively. Now the standard equipment consists of power sprayers ranging in pump capacity from 15 to 25 gallons per minute and equipped with engines of six to 15 horsepower. Why this trend to larger outfits? Briefly, the reasons may be summarized as (1) more spraying required, (2) need of applying a large amount of material in the minimum length of time, and (3) demand for increased efficiency in covering all parts of the tree.

Adequate Equipment Increases Efficiency

WHEREVER the amount of spraying has increased, the practical orchardist finds increased efficiency in using equipment that is adequate for the requirements. It requires about 90,000 gallons of solution to make one spray application in Governor Byrd's orchard on Apple Pie Ridge. Imagine one trying to do this with the old three or four horsepower sprayers, and in your mental gyrations, remember that no spray rig operates successfully unless the actual volume delivered per minute is at least two gallons less than the rated capacity of the machine. A crew of two men, using a four horsepower sprayer in this orchard, actually delivered 19,750 gallons of spray during the petal-fall application. At the same time a similar crew on a larger machine sprayed 31,400 gallons in the same orchard in the same number of days. That is why we are witnessing the passing of machines having a pump capacity of less than 15 gallons per minute and engines of less than six horsepower.

During the application of three sprays in this orchard in 1929, accurate records were kept of the performance of each machine. A crew of three men using a 15 horsepower outfit (20 to 25 gallons pump capacity) delivered 117,000 gallons of spray solution. The nearest competitor in the six horsepower class of sprayers delivered 73,600 gallons. Both sprayers were operated by the same number of men and for the same period of time.

Leading orchardists are replacing their old equipment with machines having eight to 10 horsepower engines and a pump capacity of 16 to 18 gallons per minute. Larger outfits with 15 horsepower engines and pumps of 20 to 25 gallons per minute capacity are preferred in large orchards.

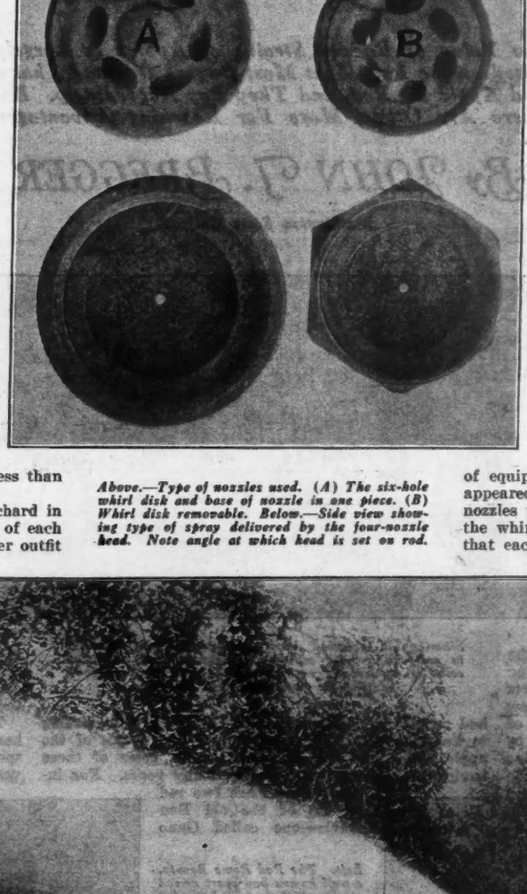
Ample power and abundance of reserve in pump capacity insures a steady flow of spray through the nozzles. The life of a sprayer, like the life of a man, is usually shortened by working it to the limit of its capacity. Machines with eight to 15 horsepower engines and pumps of 15 to 25 gallons capacity operate with more reserve, deliver a large quantity of spray more uniformly, and last longer than the small sprayers now passing out of the picture.

For most effective codling moth control, arsenate of lead must be placed on the tree where the young codling moth larvae begin their active life. This means covering both surfaces of all of the leaves as well as the young apples during the months of May and June when the first brood larvae are hatching.

Uniformity of application of the spray on all parts of the tree is not only essential for pest control but is an outstanding need in too many orchards. There is a tendency to overspray the lower limbs and miss part of the upper half, as well as to neglect the inner branches of trees 20 years of age or older. This tendency is especially conspicuous where trees are more than 20 feet high and where spray guns are used by indifferent operators. When the gun is opened to shoot a stream into the upper part of the tree, it usually results in a few spots being hit with a large amount of liquid while some branches receive very little if anything.

Considerable care is required to spray the distant parts of a tree with a stream of liquid—more care, in fact, than most orchard hands are willing to take. On the other hand, the old reeds with a couple of nozzles are too slow and have been discarded on this account and also because the long poles were more cumbersome than the short gun. Growers needed equipment which had the speed of the spray gun and the advantage of thoroughness possible with the old rods. Nozzle equipment was needed that would make it easier for the average man to spray all parts of the tree alike with a finely divided spray and do it quickly.

Only a limited number of orchard hands will carry a gun to the base of a tree and spray upward and outward. They usually object to creeping beneath low headed trees and getting wet from the heavy drip. Could equipment be found that would make it easier and quicker to spray the lower side of the foliage and thus eliminate the necessity of one man working his way between the lower branches to reach the tree trunk in order to spray upward?



Above.—Type of nozzles used. (A) The six-hole whirl disk and base of nozzle in one piece. (B) Whirl disk removable. Below.—Side view showing type of spray delivered by the four-nozzle head. Note angle at which head is set on rod.

New Type Nozzle Speeds Up Spraying

AFTER several seasons of orchard spraying during which many types and combinations of equipment were used, a nozzle-head was developed that appeared to stand out above all others in performance. The nozzles used in this cluster or head contained six holes in the whirl disk and all of the nozzles were set in a line so that each delivered a parallel cone of finely divided spray. Several feet from the nozzles the outer parts of the spray cones merged and produced a large volume of fine spray with sufficient drive to turn the leaves and wet them on both sides 12 to 15 feet from the nozzles, depending on whether three or four nozzles were used in the head. The type or quality of spray could not be altered by the operator and regardless of what he was thinking about or trying to do, the nozzle head continued to deliver the same fine spray, which equalled in volume the output of a gun.

It appeared that this equipment combined the volume output of a gun and the advantage of the old reed in insuring a continuous delivery of a finely divided spray. At the same time, the carrying power or spray drive greatly exceeded that of the old reeds and was equal to a gun when the latter was about three-quarters open. By placing the nozzle head on a rod of proper length, the operator could deliver a generous quantity of finely divided spray to all parts of the tree because no other type was possible.

The nozzle used on the old rods delivered a wide cone of very fine spray which would not turn leaves (*To Page* 26)

KEEP the YOUNG TREES VIGOROUS

The Favorable Conditions in Regard to Fertility and Care, in the Nursery Row, That Result in Vigorous Trees, Should Be Duplicated, So Far as Possible, in the Orchard, in Order to Continue This Vigorous Growth.

Trees on the right cultivated; those on the left in sod. Note difference in size and uniformity of development.

By A. E. MURNEEK

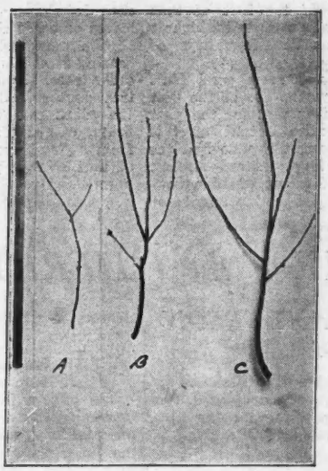
University of Missouri

WHEN A VERY young apple tree is received from the nursery, it usually shows a most splendid development. Evidently it is the nurseryman's business to grow large and healthy stock. This goal is attained only by unstinted attention to the cultivation and fertilization of soil and a watchful protection of the trees from diseases and insect pests. In general, all nursery stock is grown in a rather rich soil which is scrupulously clean.

The Young Tree Must Be Protected

COMING from such a favorable and protected environment, the young tree is exposed, as a rule, to quite different conditions in the orchard. The shock of digging and replanting, with the necessary pruning of roots and branches, does not harm the tree so much as the subsequent lack of care and protection. Indeed, too much stress cannot be placed on this point. Every year scores of young orchards and thousands of small trees are damaged and even destroyed by neglect, despite the fact that the very best stock may have been secured and carefully planted. Thus all hope of establishing a successful and profitable orchard may be blasted at the very beginning. The undertaking will come to naught sooner or later.

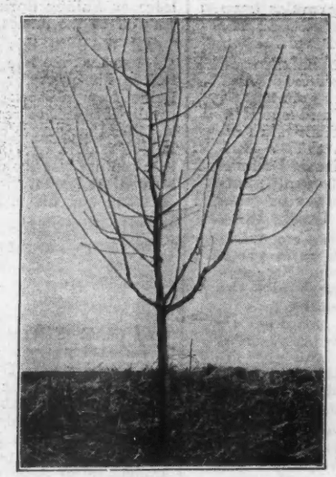
It all goes to say that a young fruit tree cannot shift for itself in an ordinary orchard. It must be protected from the severe competition with wild and more robust plants. It is no match against common grass and a host of rapidly growing weeds, even though by comparison their above ground parts may appear small in size. The roots of weeds are usually more extensive than those of a fruit tree.



(At left). A.—Typical branch from a young apple tree lacking in vigor. B.—Average branch from young trees that have been pruned too much. C.—Young apple trees should produce branches of this type.

(Right). Young apple tree showing good growth and development. Pruning has been moderate.

(Below). Vigorous trees will grow well and produce good crops at the same time.



Proper Soil Conditions Essential

TO provide the proper soil environment at least, a strip of ground should be cultivated for a distance of five or six feet on both sides of the row of trees. If this is not feasible, due to erosion, then the soil should be spaded up to the same distance around each tree. Clean cultivation during the first eight years is generally advisable. It will not only remove all other vegetation from the root area of the tree, but by hastening bacterial action and decomposition of organic matter, will release more plant food than is present in the soil. Cultivation should be maintained till the middle of summer, when it may be discontinued to facilitate the proper maturing of wood as a protection against winter injury.

During seasons of a scanty rainfall, cultivation will tend to conserve effectively the moisture supply. Growth and development of an apple tree may be severely checked by lack of water in the soil. As a consequence, the foliage will be lost early in the fall and the branches will remain thin and scrawny. During a dry summer, trees surrounded by much vegetation will suffer frequently from a serious attack of grasshoppers and other chewing insects. A large part of the leaves may thus be destroyed and even the bark gnawed off the smaller twigs. Trees so injured will grow less and produce fewer leaves and buds the next year.

An orchard may be inter-cropped with vegetables or small fruits, especially strawberries, without doing material damage to the trees. An income is thus produced from the land before the bearing age of the trees is attained. One should go cautiously, however, in planting corn too closely to the trees. This crop requires not only a large quantity of soil nutrients, but exerts a very heavy demand on the moisture supply of the soil. In light open soils corn may seriously reduce the vitality and check the normal development of fruit trees.

Spraying Important

ONE of the most important features of protection of trees is spraying. Because it does not bear any or only a small number of fruits during the first few years, the young orchard is often sadly neglected in this respect. Many sprays, of course, are applied primarily for the protection of fruit, but others are for the preservation of health of the vegetative parts. No disease or insect pests should be allowed to destroy the foliage, since only the leaves are able to elaborate the food that is necessary for the rapid development of the plant. A tree with poor foliage will never make any headway. Spraying must be for a particular disease or insect, not just seasonal. The first signs of an injury should be noted and the necessary control measures taken promptly to combat the pest. No orchard can be grown successfully without proper spraying.

In years of rapid succulent growth, fire blight is often serious on young trees. It pays to remove the blighted twigs as soon as discovered. This work is relatively inexpensive due to the small size of the plants. Vigor in the young apple tree is not maintained by too heavy annual pruning. While at planting, the branches are cut back severely in order to balance the top with the reduced root system, pruning during the subsequent years should be quite light. Most trees, however, will need some thinning out of branches and the heading back of a few twigs to develop a balanced and sturdy frame. Heavy pruning, especially heading back, will reduce the normal rate of development and may lead to a delay in bearing.

Trees producing good crops of fruit, no matter of what age, require, however, an annual winter pruning. This is particularly true in all such instances where too many branches have been left during the formative period of development. Judicious pruning will reduce competition among the branches for the available food supply, resulting in better foliage, larger and brighter fruit and an increased vigor and growth.

Maintaining Soil Fertility

SOIL fertilization is above all things a factor of paramount importance in the maintenance of vigor in the apple tree. When the orchard is planted on a naturally rich soil, like the deep loess along the Missouri and Mississippi rivers, little difficulty will be experienced in maintaining a high degree of fertility. Poor sandy soils have to be enriched regularly and systematically.

There is no better fertilizer for apple trees than stable manure, but it is becoming scarce and expensive. Orchard soils may be improved readily and cheaply by growing an adaptable legume as a cover crop. Leguminous crops are most desirable, since they will add to the soil not only organic matter, but also nitrogen, which they secure from the air. Sweet and red clover, vetch, cowpeas and soybeans are very valuable cover crops in the midwestern States. Most cover crops are sown early in the fall and turned under in the spring. (*To Page* 24)

ARMOUR'S "BIG CROP"

BUILDS STURDY TREES, VINES AND CANE

ARMOUR'S Big Crop High-Analysis is not a temporary fertilizer. It immediately increases the yield, of course. And makes firmer, better colored fruit. But Big Crop does more. It gives trees, vines and plants more vigor. Builds them up. Makes them disease-resistant! Thirty-five years of developing Big Crop formulas have made them a powerful food for trees, vines, cane, and fruit.

There's the right balance of nitrogen to set a larger crop. And the correct phosphorus content to make it fruit early and speed it into maturity. The fruit takes on a finer color, grows thicker cell-walls and becomes firmer because of the potash. Nitrogen, phosphorus, and potash are proportioned to perfection in Big Crop.

After the yield, Big Crop fairly breaks its back in making the plant-structure more sturdy. Nitrogen, phosphorus and potash give the wood and leaf a healthy growth, and promote spur and bud development. They give a vigorous root development — and give the trees, vines and plants a later growth, so they're able to fight diseases and resist winter killing.

When you fertilize, don't think only of this year's yield. Build for the future with Armour's Big Crop. If you don't know the name of your nearest Armour dealer, write us today. Send the coupon for a copy of Armour's Farmers' Almanac.

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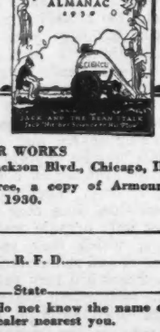

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The Staymared (right) as compared with the Stayman (left) has a more attractive, darker color all over. It starts to color earlier, and at harvest time the deep, "all-over" red presents a startling contrast with the color of the old Stayman. The keeping quality is also much improved, as this "sport" appears to be very resistant to scald.

The STAYMARED APPLE

By W. S. CAMPFIELD

Secretary, Virginia Horticultural Society

A NEW APPLE variety that is bound to gain much popularity and commercial value is the "Staymared," a strain of the popular Stayman Winesap. It is a Stayman in every particular except for the deep, all-over rich red color and a much less tendency to scald.

For the birth of this wonderful new apple, nature selected a most picturesque spot in the Warm Springs Valley of "Old Virginia," 3000 feet above sea level, where the clear, pure air is full of song and energy; where the carpet of luxuriant blue grass follows the receding timber-line often to the very mountain top, and a pure, sparkling stream winds its way down the slopes to take a final plunge of several hundred feet over the limestone ledge at Falling Springs before it scampers off to the James River.

IT WAS in this valley many years ago that the late B. C. Moomaw settled in his quest for health and wealth. Being from a stock that was horticulturally inclined, he realized the great possibilities that nature offered for the growing of fruit along these foothills. His first venture was the development of what became the largest "water cress" farm in America, and his market range was extended as far as New York and Chicago. This venture was not only a financial success, but furnished the foundation for the development of the present Moomaw Orchards at Barber, Va.

From the many slopes along the mountain side, the elder Moomaw selected two or three of the most promising for the site of his apple orchard, which he planted extensively, but continued to harvest cress while he waited for the trees to come into bearing.

HE PLANTED Pippins, Baldwins, Winesaps, Yorks, Grimes and a large block of Stayman Winesaps. All of these varieties were well suited to the locations he selected for them. The Stayman block is indeed a fine lot of trees and their fruit is of the best of that variety, which indeed grows to its highest degree of perfection in the valleys of Virginia.

That the Moomaws grow good fruit and that their Staymans are of the best is attested by the fact that for the past six years their entire output of this variety has been bought by one and the same dealer in a large eastern market. By chance in 1924 a car of Moomaw's Staymans was shipped to this buyer and it so pleased his trade that each year thereafter he has purchased the entire Stayman crop.

IN THE center of the block of Staymans is one tree that in every respect is a typical Stayman except that its fruit begins to color earlier, and at harvest time even that on the under branches has a more attractive, darker color all over than any other Staymans in this orchard or in this part of Virginia. The color is very pronounced when compared with the average Stayman and the keeping quality was found to be very much improved because of lack of scald which by experience led the Moomaws to keep the fruit from this tree for their home use.

So outstanding was the color characteristic of the fruit of this tree that it was reported to Stark Brothers Nursery. After a full investigation they purchased the tree outright from the Moomaw Orchards.

A CAREFUL study of this tree disclosed not the slightest difference in shape, habit of growth, bark, leaves or other characteristics from those of the surrounding Staymans, and its bearing record is equal to the best of the other trees. Nothing in its surroundings, treatment or soil conditions accounts for the dark all-over red fruit that it bears, except that it must have sprung from a "bud sport." It is but a result of that strange process that only nature knows and uses to provide mankind with new and improved varieties.

YELLOW LEAF of the CHERRY

By H. W. ANDERSON

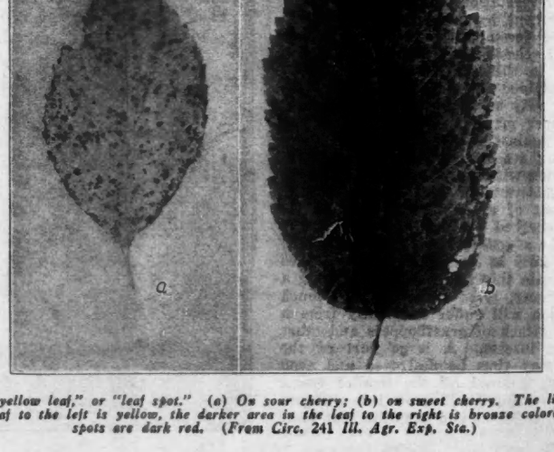
University of Illinois

"DEAR SIR: The leaves of my cherry trees are turning yellow and dropping off. I think the trees will die unless something is done. What is the trouble and what should I do to stop it?" This, with only slight variation in wording, represents the contents of two or three letters per day which are brought to my desk from the first of May to the middle of August. The unusual number of such inquiries during the past three years is due, no doubt, to the wet springs which have prevailed. This has resulted in such severe outbreaks of the disease that everyone who owns a cherry tree has noticed the yellowing of the foliage during the months of May and June.

CHERRY "yellow leaf," or "leaf spot," is caused by a fungus which has the rather awkward scientific name *Coccomyces hiemalis*. The fungus lives over winter on the fallen leaves and produces, in the early spring, a peculiar cup-shaped structure about half the size of the head of a pin, in which occur many spore-bearing sacks. When wet, these sacks burst and the spores are shot upward into the air. These spores are carried by currents of air or by the splashing of water to the leaves, where they germinate and cause infection. Frequently seedling trees not over four to six inches high are found heavily infected before any of the leaves of the mature trees are diseased.

The first spots produced may not be very numerous but they are important in that the summer type of spores are produced in enormous numbers on the underside of the leaves and these in turn infect many new leaves, thus spreading the disease rapidly throughout the orchard. Continuous crops of spores are produced and fresh infections take place throughout the season, if weather conditions are favorable.

THE fungus seems to have a peculiar toxic effect on the foliage. Even when only a few spots are present, the leaves will turn yellow and fall. The result is that with only a moderate infec-



Cherry "yellow leaf," or "leaf spot." (a) On sour cherry; (b) on sweet cherry. The light area in the leaf to the left is yellow, the darker area in the leaf to the right is bronze colored. The spots are dark red. (From Circ. 241 Ill. Agr. Exp. Sta.)

tion the trees become defoliated. This condition is especially serious in nurseries where the growth of the young trees is so seriously checked as to result in an inferior grade of nursery stock.

Defoliation of bearing trees results in a renewed growth late in the season. This brings about changes which are very detrimental to the tree, and it has been observed that not only is the crop of the following year reduced, but frequently the trees are killed outright during the winter following defoliation. Quite often the winter injured trees appear normal in the spring but suddenly die after the leaves have started. When defoliation occurs early in the season, the fruit is small and of inferior quality.

The yellow leaf fungus attacks both sweet and sour cherries. The yellowing of the leaves is more conspicuous on sour than on sweet cherries, but defoliation may be worse on the sweet varieties. Practically all varieties are susceptible. Over 30 varieties of both sour and sweet cherries were observed in the variety orchard at the Illinois Agricultural Experiment Station and all were seriously affected.

THIS disease is fairly easy to control with any of the standard fungicides. However, it is necessary to make the applications at the proper time and over a rather long period if wet weather prevails. Spraying should be initiated at the time the first spray is applied for curculio, that is, at shuck fall. Shortly after the petals have fallen, the young fruit grows rapidly and bursts the old calyx which does not fall with the bloom. The proper time to spray is when the shucks or old calyxes are about two-thirds off. One should use two gallons of liquid lime sulphur and three pounds of lead arsenate to 100 gallons of water, or Bordeaux mixture 3-6-50 with the same amount of lead arsenate.

Recently a new type of sulphur, called Flotation sulphur, has been put on the market. This sulphur has been successfully used for control of yellow leaf and is less likely to cause injury to the foliage and fruit. In later sprays it is advisable to use this, since it does not stain the fruit. It comes in a paste form containing about 40 to 50 per cent of water. In this form it should be used at about 16 pounds to 100 gallons of water.

About 10 days after the first application another should be made, using any of the above fungicides in the same proportions. Another spray should follow, the application being made approximately two weeks before the harvest. This should consist of the Flotation sulphur or some of the commercial wettable sulphurs which do not contain lime. The lead arsenate should *not* be used at this time.

If leaf spot has appeared or if the season has been wet, another application should be made immediately following the harvest. If the grower has been troubled with cherry slugs, lead arsenate should be added to this spray.

For varieties maturing late, the third application should be made about two weeks after the second and an additional one made between that period and harvest.

In the nursery, applications should be made about every two weeks throughout the season. Bordeaux mixture is better than lime sulphur for nursery practice, but the Flotation sulphur gives good results when applied often and thoroughly.

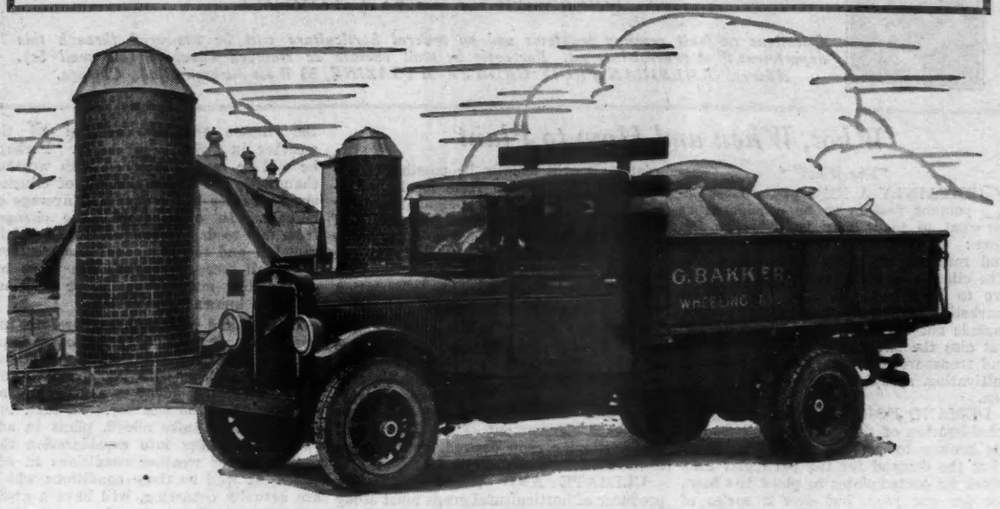
In the orchard, Bordeaux mixture has been found to decrease the weight of the fruit over that of trees sprayed with lime-sulphur. Since lime-sulphur has a tendency to stain the fruit and sometimes to cause injury, it is advisable to use Flotation sulphur, unless the orchardist has had experience with the other fungicides.

Farm Board Grants Apple Loan

THE Federal Farm Board recently announced that it has approved an application of the Wenatchee District Co-operative Association, Wenatchee, Wash., for a commodity loan of not exceeding $40,000 on Winesap apples. This loan is supplemental to one from the Federal Intermediate Credit Bank, Spokane, Wash., and will enable the association to advance to its grower members a larger percentage of the market value of their product.

Dollar-Making Experiences in High-Speed Farm Transportation

READER NOTE: This is the tenth of a series of Farmers' and Fruit Growers' Personal Experiences, relating to the Profit Side of the high-speed haulage of farm products and live stock, which should be of especial interest to those who recognize the all-important part the SPEEDY MARKETING of farm products plays in making farming PAY.



"I've Put 50,259 Miles On My Speed Wagon In 6 Months

Through Weather and Over Roads I'd Never Have Tried Before!"

"Reo Motor Car Company,
Lansing, Michigan.
Gentlemen:
. . . I own a model FC Speed Wagon and have put 50,259 miles on same in the last six months. This truck has proved very satisfactory under all conditions. I have one haul of 52 miles one way practically every day regardless of weather.

There has been practically no mechanical work done on this truck. I get on the average of 12 miles per gallon of gasoline. My loads run on the average of 3-ton. On each round trip I save, in time, a half day over that of another truck, which I used to operate. Five farmers in my immediate vicinity have purchased Speed Wagons on the performance of mine.

In a recent snow storm I pulled through drifts that I never thought of going through before—practically the only truck in this vicinity that could make the trip to the market the first day of the storm.

The performance and the reliability of a Reo Speed Wagon is the best recommendation that I can give it.

Gerrit Bakker, Wheeling, Ill."

THE farmers who make money today are the farmers who are equipped to take advantage of high prices in distant markets. Twenty-four hours makes a big difference in the prices you get on farm products. To get the highest prices you need up-to-the-minute news on markets and fast dependable transportation that will get your produce to these markets quickly, safely and in first-class condition. That's why farmers today, when they get down to figuring *actual* hauling costs—to figuring how little *good* transportation costs—buy Speed Wagons.

Reo pioneered trucks for farmers—trucks specially designed to meet farming needs in speed, capacity, economy and long life.

Reo's present-day Speed Wagons offer farmers an even greater measure of economy and long life. Based on Reo's long experience in this field, these Speed Wagons for farm use are designed to master today's farm hauling conditions.

They offer farmers the most *flexible* of transportation—increasing hauling radius—shortening the haul from farm to more profitable distant markets. And they offer tremendous advantages in speed with safety for load and driver.

Yet Reo engineers have done more than adding these new performance factors to Speed Wagons. They have made these qualities even more lasting than before.

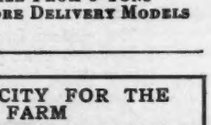
Chrome nickel alloy iron cylinder block—the hardest of all cylinder materials; new low-expansion, *longest lasting aluminum alloy pistons*—an exclusive Reo formula—outwearing 3 ordinary pistons; in fact, every improvement in design and manufacture that could *lengthen life* and *increase efficiency* has been added. *6-cylinder engine; 7-bearing crankshaft;* full pressure lubrication; *4-wheel, 2-shoe internal expanding hydraulic brakes; 4-forward speed transmission;* Myers *built-in magazine chassis lubrication;* only the very best tires, and other features are part of Speed Wagons for farm duty.

See these Speed Wagons before you buy any truck. Prove for yourself that Speed Wagons will handle your hauling faster and cheaper—mile after mile—for an unbelievably long, trouble-free life. *216-R*

REO MOTOR CAR CO., *Lansing, Mich.*

REO LONG LIFE SPEED WAGON

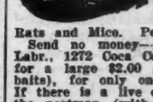
Reo Speed Wagon with school bus body. Speed Wagons are meeting with great success throughout the country in this service.



Speed Wagon 1½-ton capacity with express body. 6-cylinder engine designed for fine performance and economy of operation. 4-wheel, 2-shoe, internal expanding hydraulic brakes give positive safety.

EVERY SIZE FROM 3 TONS DOWN TO STORE DELIVERY MODELS

Bonus for Live Rats



35c plus your money back, if Tempto Rat Killer fails to get them all. ONLY KIND, not a squill or other poison. Harmless to anything but Rats and Mice. Pests die outside.

Send no money—just your name to Imperial Labr., 1272 Coca Cola Bldg., Kansas City, Mo., for a large $2.00 Farm Size pkg., (makes 200 baits), for only one dollar, on 15-Days, Trial. If there is a live one left, the dollar you paid the postman (with postage) will be cheerfully refunded, plus 35c for your trouble. You risk nothing, so write today.

FARM CONCRETE

By K. J. T. Ekblaw. Tells how to mix and proportion cement for the best results, how to handle it in cold weather, how to estimate cost, how to make forms, and other practical problems. For farm building, the author tells how to use concrete in various ways, such as for foundations, walls, pavement, floors, steps, building blocks, fence posts, cisterns, drain tile, etc.
Cloth, 295 Pages, Ill., $2.40

ELECTRICITY FOR THE FARM

By Frederick Irving Anderson. This book tells how to harness waste water power, and when that is lacking, how to use a gasoline engine or a windmill with a storage battery. It explains the working principles of electricity, the detail of the generator and the dynamo. Chapters on transmission and wiring enable the farm mechanic to install his own plant. Cloth, 265 Pages, Ill., 75c

Books sent postpaid on receipt of price. Send orders to Book Department.

American Fruit Grower Magazine, 53 W. Jackson Blvd., Chicago, Ill.

QUESTIONS and COMMENT

Conducted by T. J. TALBERT

Questions on fruit growing problems and on general horticulture will be answered through this department if of general interest. For reply by mail enclose 2c stamped envelope (air mail 5c). Address AMERICAN FRUIT GROWER MAGAZINE, 53 West Jackson Blvd., Chicago.

What, When and How to Plant

"The What"

CERTAINLY A FEW of the most important factors to be considered as to what to plant may be listed as follows: 1. The demand for the product and resultant profits to be obtained. 2. The climate in which the plant or plants are to be grown. 3. The problems of marketing and handling, which, of course, include not only the sale of the product, but also the harvesting, grading, packing and transportation. 4. Labor supply for cultivating, spraying, harvesting, and the like.

DEMAND FOR THE CROP.—In the consideration of this problem it behooves the grower to make a careful study of what the demand for the particular crop which he contemplates to plant has been, not for one year, but over a series of years. It will usually be possible to obtain this information from local producers in the immediate neighborhood or community, from the county agricultural agent, should there be one, and from the State agricultural experiment station. It is also true that there may be other sources from which valuable information on the problem may be secured.

When the facts regarding the demand or need of the horticultural crop have been investigated, the producer may then proceed much more wisely, and he will also have the satisfaction and contentment that comes from taking the guess or hazard element out of the growing of the particular crop desired, as much as is possible.

CLIMATE AND WEATHER.—The producer of horticultural crops must study the climate and take account of the weather in growing his crops. Perhaps he will be more concerned with weather than with the larger element of climate, since weather is the sum and average of climate. In other words, the changes from day to day in temperature, rainfall, snowfall and the like constitute weather. When all these phenomena are taken together they make up a larger division, which is known as climate.

Climate and weather are, therefore, important because all planting operations, growth, fruiting, cultivation practices, and such work as spraying, pruning, and the like, are dependent to a great degree at least upon the weather. In fact, the producer who looks ahead, plans in advance, and takes into consideration the probability of weather conditions in advance, as well as those conditions which are actually occurring, will have a great advantage in horticultural crop production. This is true because plantings are likely to be made earlier or at more nearly the proper time to secure the best growth and production, or to have the particular crop mature when the market is in the greatest demand for it.

A specific example will illustrate the point. Often during the spring time the potato grower who endeavors to get out his crop early to have potatoes to sell on the early market may not have more than two or three days at most during which he is able to plant the crop that is to be harvested early. Should he for any reason be unable to take advantage of the two or three days during which the weather is suitable for working and the soil is in condition for handling, he may fail to supply the early market and to receive the highest price.

MARKETING AND HANDLING FACILITIES.—Under this will, of course, come up for consideration the roads over which the horticultural products are to be hauled—to market or to the shipping station. If the distance is great and the roads are bad, the prospects of producing and selling the particular crop may be justly questioned. With the development of good roads throughout the country, however, it is possible to grow horticultural crops economically and profitably much farther from shipping and selling centers. In this connection, however, it must be remembered that, although good roads may prevail, long hauling distances make carrying charges higher. The time element also enters in, as well as the factor of damage through such transportation or hauling.

Under this head, the producer will do well to investigate the shipping to marketing centers by railroad. This is important because he may not be able to handle his entire crop over highways by means of trucks or otherwise. In fact, if there is an outlet through the roadside market by means of trucks to profitable marketing centers, and also practical ways of shipping by railroad, the producer is all the better located, because he is able to take advantage of whatever method of transportation or handling which may meet his needs best.

LABOR SUPPLY.—In considering the problem of what to plant, the labor problem may play an important role. Unless labor is adequate or sufficient for cultivation, fertilization, spraying, pruning and such other operations as are required or needed for the profitable growing, picking, grading and packing of the particular crop, it may not be profitable for the grower to undertake production.

An outstanding example of the need of labor may be cited particularly in reference to the harvesting, grading and packing of strawberries. This, of course, is a highly perishable crop and greater demands are made on labor when it is needed than perhaps in the harvesting of any other horticultural crop. It serves to illustrate, however, the importance of the labor problem.

"The When"

COOL SEASON CROPS.—Such cool season crops, for example, as deciduous fruit trees and truck crops like cabbage, onions, radishes, and the like, should in most sections be planted as early as weather and soil conditions will permit. This is true because it is usually to the advantage of the producer to have the crops in the soil early in the spring in order that they may have time to make the maximum growth and development during the so-called growing season.

There are, of course, modifications or changes which should be made in this general plan, particularly with reference to truck crops or garden crops. This would occur where it seems desirable to have a succession of the particular product. Where this is true, it may be necessary to make a number of plantings at different times so as to prolong the harvesting and marketing season.

For the planting of deciduous fruit trees, however, including apples, peaches, cherries, plums, and the like, we may experience a spring now and then when medium to late planting might give better growing conditions than early planting. All factors considered, however, taking into account all farm work, it is believed that the grower of horticultural crops will on the average find it to his advantage to plant his trees as early as conditions will permit. Even then he may be forced to plant in midseason or moderately late some years. As with the growing of crops generally, it will be found that much good judgment and discretion will be required. Moreover, it will be necessary for the producer to make quick decisions and decide for himself many of the problems connected with "The When" to plant. It is well, of course, to have all the information and suggestions of those of experience and of those informed, but, after all, it will be the problem of the producer to adapt these to his own local conditions and surroundings.

WARM SEASON CROPS.—The warm season crops, of course, should be planted after all danger of frosts is passed. The free frost dates may be obtained from the local weather bureau, the county agricultural agent, the State experiment station, and from other sources.

It is common knowledge that the so-called vine crops, like the melons, and the tomatoes, peppers, and others, are so tender and likely to be injured by frost that the plants should never be planted until the frost hazard is over. If they are planted earlier, it is, of course, wise to have facilities for protection should it be needed.

The work with the various kinds of horticultural crops, including both the cool season and warm season crops, will soon familiarize the grower with them sufficiently to permit planting at approximately the right time in order to secure the results most desired.

"The How"

SECURE INFORMATION.—Where for any reason the grower is unacquainted with the best method of doing the actual planting work of the particular crop that he desires to grow, it is all important that he know where this information may be secured. Again, it may be necessary to advise with local growers, the county agent, the State experiment station, and other sources of information. When this is received, it will still be necessary to give "The How" considerable thought in order to adapt the information to the problems of the particular farm or plantation concerned.

USE BEST METHODS.—The best growers, it has been found, usually employ the best methods of planting. To do this, more work is usually required, the expense may be greater, and the effort more exhausting; yet this is what will generally bring the greatest returns. In fact, it may mean the difference between success and failure. The extra effort, the better preparation of the seed bed, the better treatment of the seed, the better cultivation, the better fertilization, the better spraying, the better picking, grading and packing, all together or taken separately, may make the one grower a profit while the other grower, who neg-

Before the Blizzard Struck the Schoolhouse

A Bell System Advertisement

TWENTY PUPILS were gathered one mid-winter afternoon in a little white schoolhouse in the prairie country of North Dakota. At half-past three there was a general ring on the telephone. Answering it, the teacher learned from the operator that a severe blizzard, moving at the rate of sixty miles an hour, was reported from a town fifty miles away. The families of a number of the pupils received this same telephone warning, and within ten minutes enough teams were at the schoolhouse to take all the children home in safety.

The teacher then fixed her fire, and was able to reach her boarding place before the blinding snow and wind isolated every building in the countryside.

* * *

The telephone renders valuable aid in any emergency—in cases of accident, sickness and fire. Whenever there is livestock, hay or grain to be bought or sold, the telephone gives profitable assistance in arranging the most advantageous terms. It is always ready to run errands, bring spare parts for broken machinery, or keep families and friends in closer contact.

The modern farm home has a telephone that gives service, rain or shine.

lects these practices, may break even or lose on the crop grown.

Head-Work Important

IN CONSIDERATION of "The What, the When and the How," it goes without saying that head-work will play an important part. Such thought, study, and consideration, it is believed, is the big factor which will make for success in producing horticultural crops. Just as in the sale of goods, the man who knows his problems, who studies and uses the best methods, who becomes thoroughly acquainted with all factors concerned is the one most likely to succeed.

In the competitive work of producing horticultural crops, therefore, head-work is bound to play a more and more important part. The sooner producers generally recognize this fact and do their very best so far as the employment of head-work and muscle work combined to the best advantage is concerned, the sooner they will place their producing operations upon a profitable and worth while basis.

Treating Peach Trees for Cold Injury

REPORTS from the Central States indicate that, due to the low temperatures experienced a few weeks ago, most of the peach fruit buds have been killed. Moreover, in many instances it appears that the wood of the branches and trunk of the peach trees has been injured, in some cases fairly severely, while in others the injury is slight or not material.

Peach growers generally prune somewhat heavier during the so-called off-crop year. Since this will be an off-year, in many instances at least, no doubt an opportunity will be afforded to cut back peach trees more severely than during years when crops are produced.

On the other hand, it is never wise or profitable, as a rule, to dehorn or cut back peach trees severely after injury by low temperatures. This is true because the resultant growth after heavy cutting is usually unsatisfactory for fruiting the following year, even though it may be a good crop year. When trees have been injured, as no doubt they have been in many orchards this year, heavy cutting back may prevent the trees from starting growth in the spring and, as a result, such trees may die.

Moderate pruning, therefore, is suggested for peach trees during the remainder of the winter and in the spring. The pruning may consist of thinning out the clusters of thick branches and cutting back in some cases into as much as two-year-old wood. This may be necessary to develop the proper shape and to stimulate new growth closer in toward the main trunk. Moreover, much of the one-year wood may be cut back, and occasionally it is likely to be necessary to cut into two-year wood in order to secure the proper spacing between branches and to develop fruiting wood where it is needed.

The chief characteristic of winter injury to peach wood is discoloration of the inner wood, varying from light to dark brown. It should also be remembered that trees devitalized by borers, gummosis, and starvation are more likely to be injured seriously than healthy, vigorous trees.

Handling Frozen Trees

AS A RESULT of the unusual cold weather of the past few weeks, reports stating that winter injury is showing up on the trunks of fruit trees are fairly prevalent. The injury is generally indicated by a cracking or splitting of the bark. These bark splits may range all the way from the base of the trunk up to where the large branches are attached. In some instances crotch injury is also observed by marked cracking and splitting.

Where the bark splits or cracks in such a way as to cause it to cup or bend upward, leaving the wood exposed, it is usually advisable to replace the bark quickly in position. The bark, if alive, will unite with the wood, but if it is dry and dead, it will not. The sooner the

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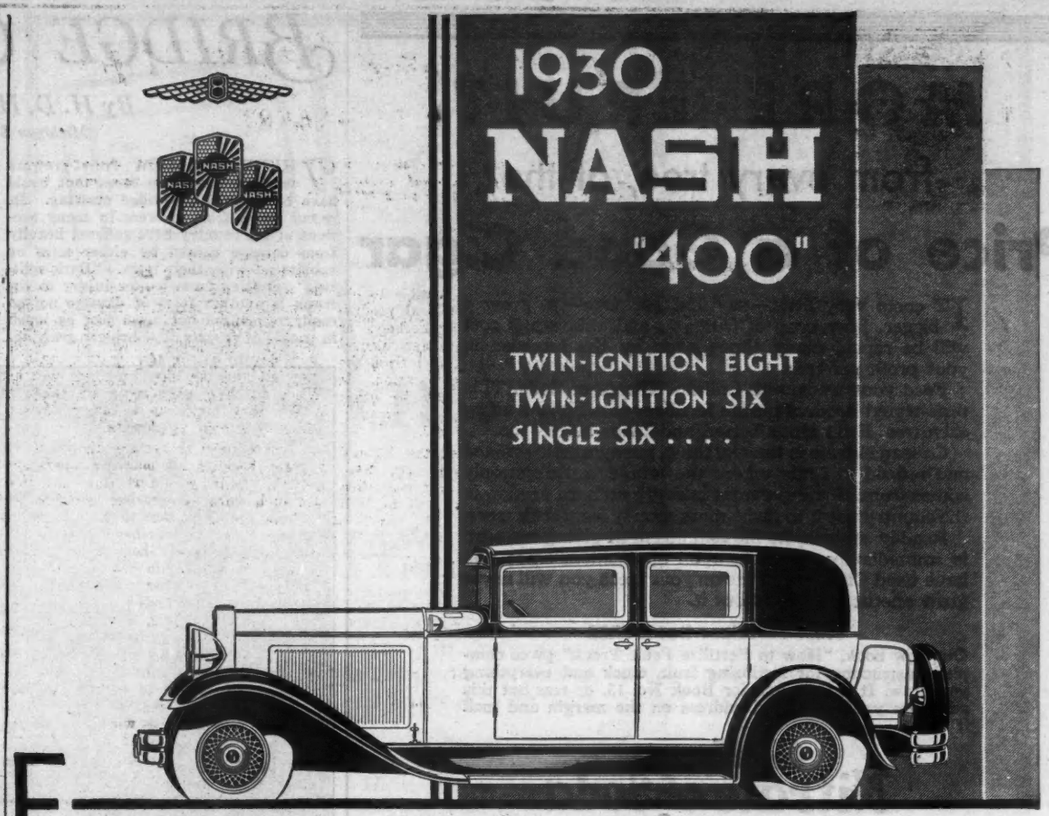

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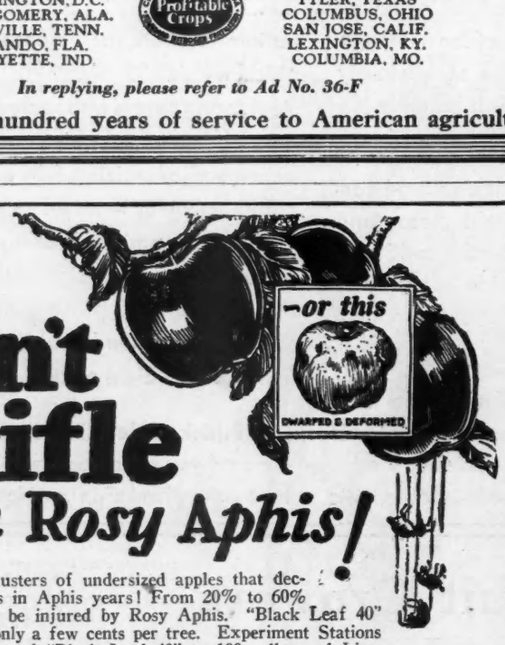

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BRIDGE GRAFTING

By H. D. HOOTMAN
Michigan State College

THERE ARE FEW fruit growers who have not lost trees that could have been saved by bridge grafting. In recent years fruit growers in many sections of the country have suffered heavily from damage caused by either mice or rabbits gnawing their trees. "Bark splitting" resulting from winter injury to the trunk is another form of damage not so easily recognized but often just as much in need of repair by bridge grafting.

Winter injury on the southwest side of a McIntosh tree. The injured bark was removed and the exposed wood preserved with a thin coat of brush wax before the scions were set.

Damage to the trunks of trees is one of the constant hazards of the fruit grower.

Prevention Measures

MUCH publicity has been given to rodent control and other preventive measures. The practice of these preventive measures has no doubt greatly reduced the amount of girdling that would have otherwise occurred. A few of these are: (1) poison baits; (2) mounding the base of the tree with earth late in the fall; (3) the removal of weeds and grass from near the base of the tree where mice may harbor; (4) tramping the snow around the base of the tree after the first snowfall; (5) the use of metal, wood or paper tree protectors; (6) pruning scattered trees through the orchard in late fall so that any rodents tempted to feed on bark will choose the more tender bark of the removed branches on the ground in preference to the older bark of the trunk; (7) and the encouragement of the natural enemies of field mice. Not long ago in the orchard of a prominent fruit grower I saw this sign, "Mr. Hunter—Don't kill a hawk, owl, skunk or weasel." Apparently the owner had done some thinking and was enlisting the services of the natural enemies that prey upon rodents.

This mature Northern Spy tree in the orchard of Thomas S. Smith was severely injured by the cold winter of 1917-18. The trunk, which is now 20 inches in diameter, is entirely covered by bridge grafts. Over 40 bushels of apples were harvested from this tree in 1929.

Bridge Grafting Not Difficult

UNFORTUNATELY, many growers do not feel the need of precautionary measures until they have had trees girdled. Bridge grafting is no small consumer of time and labor and any means taken to avoid the need of bridge grafting is time well spent.

However, no one who has had valuable trees girdled should hesitate about employing bridge grafting to save them. One who understands the various steps in the operation and is sufficiently skillful with his hands to fit closely together two pieces of wood can reasonably expect at least 75 per cent of his scions to grow. After mastering the intricacies of the operation, a little practice will enable the average operator to set and wax six or eight bridge grafts in about 20 minutes.

It is hoped that this article may aid those readers of AMERICAN FRUIT GROWER MAGAZINE who have trees to be bridge grafted, by acquainting them with several of the ways by which bridging can be accomplished.

A young Golden Delicious tree that has been saved by bridge grafting. One scion failed to make a contact at the top the first year. Notice that the two sprouts arising from it were "reset" higher on the trunk the following year.

Bridge Grafting Justified

IN EARLY spring when girdled trees are first discovered, the grower is often inclined to feel that the damaged trees should be repaired at once if they are to be repaired at all. He is conscious of the many other tasks at hand, such as pruning, picking up brush, spraying and cultivating, or the pressure of other farm work, all of which are bidding for his time. Even under these circumstances the girdled trees need not be neglected and forgotten. If girdling threatens the life of valuable trees, the additional investment of time and a little material to save them is surely justified.

Care of Scion Wood

SCION wood that is still dormant should be gathered at once if it has not already been procured. Scions the size of a lead pencil long enough to cover the injured area and of hardy varieties such as Duchess, Wealthy or Tolman Sweet, are to be preferred for this work.

They should be stored in some convenient place where they will not dry out and where it is cool enough so they will remain dormant until near blossoming time.

Time of Bridge Grafting

THE bark often does not slip readily much before the blossoming season. Attempts at bridge grafting earlier than this period are often associated with difficulty in removing or slipping the bark. Bridge grafts set before the bark slips often fail to grow because contact between the cambium layers has not been made.

When trees have been girdled at the ground level, the careful removal of the

The crown and root system of this young Jonathan tree was damaged by winter injury. The tree has been saved by inarching—planting young trees around it and setting them so that a contact between the cambium layers is made.

earth for several inches below this point a few days before the grafting is to be done will cause the bark to slip more readily. The grafting work should not be attempted until the bark of the tree slips well.

Treatment of Young Trees That Have Been Girdled

WHERE young trees not more than a year or two of age have been completely girdled, it might be better to

Notice the vigorous growth of the two scions set vertical. Another scion or two set vertical would have covered the wound sooner than will the seven or eight set at an angle.

dig them up and replace them with new trees. If the injury is some distance above the crown of the tree, the tree can be saved by sawing it off and practicing cleft-grafting, as described in the December issue of this magazine. It is not feasible to set two scions on this small stub, a modification of the cleft graft will probably fit the conditions better. Cut one side of the small stock at a sloping angle approaching 45 degrees and

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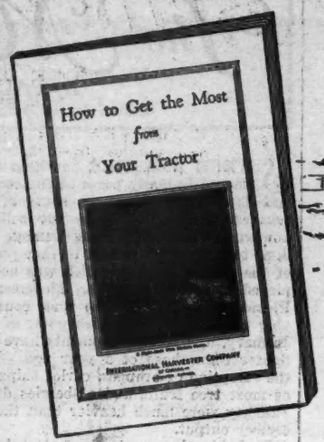

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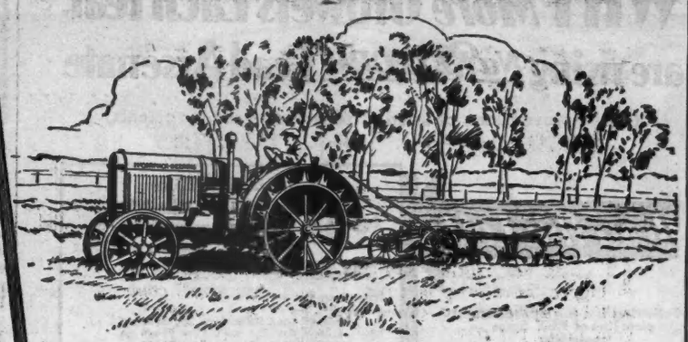

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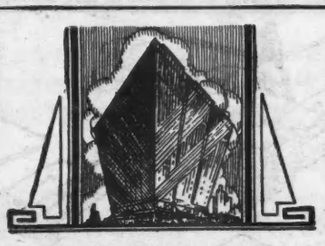

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February 27th, 1929

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Manager

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In the picture there are 7 cars in a bad traffic jam. None of them can move forward, for each car is blocked by the one in front of it. One of these cars will have to be backed out. Which one? The traffic policeman seems to be stumped. Can you straighten up this tangle for him? Only one car may be moved backward, and if you pick out the right one, you will see that it is not necessary to back up any of the others. Send the number of the car which when backed out will relieve this traffic tie-up, and if your answer is correct you will be qualified for this opportunity.

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ARTHUR MESKE, Dept. 43 510 N. Dearborn St., Chicago, Ill.

The Market Review

By PAUL FROEHLICH
United States Bureau of Agricultural Economics

SEVERE WEATHER has been experienced in many parts of the country and low temperatures in some of the southern States. It was not believed, however, that any serious damage was done to fruit trees, except to that portion of the grapefruit crop which was not yet picked in southern Texas. Movement of Florida strawberries also was considerably reduced from the high point of mid-January, and recent shipments have been lighter than those of a year ago. With the exception of oranges, carlot shipments of most tree fruits and of berries during January were much heavier than the December output.

Probably the event of greatest importance to fruit growers during the past month was the release of the annual Outlook Report of the Department of Agriculture. Brief summaries relating to fruits are given below.

The complete outlook statements for 1930, in printed form, can be obtained from the Bureau of Agricultural Economics, Washington, D. C., or through members of Congress.

The 1930 Outlook Report

APPLES: As indicated in the 1929 outlook report, commercial production for the country as a whole probably will continue to increase gradually over a period of several years. However, the apple industry has recovered largely from the disturbed conditions which accompanied the rapid expansion of plantings in the Northwest and elsewhere, 20 to 25 years ago, and the rate of increase in commercial production is expected to be less than it was during the years when these plantings affected production most. The extent to which the industry has recovered and the tendency toward more moderate plantings in recent years is encouraging for the efficient commercial grower, who produces fruit of high quality. However, the large number of relatively young trees now planted indicates an increase in commercial production over a period of years, as well as heavy production and low prices when weather and other growing conditions are especially favorable throughout the apple areas. Notwithstanding the low production and the relatively good prices of 1927 and 1929, commercial plantings appear to be justified only where unusually favorable conditions exist for the economical production of good-quality fruit.

Peaches: Notwithstanding the small crops of peaches in most of the leading areas in 1929, due chiefly to adverse seasonal conditions, the number of trees of bearing age is still so great as to make possible heavy production and unfavorable marketing situations during the next few seasons. In the South, the peak of production from trees now in orchards has probably been reached and the trend is expected to be downward. In California the indicated trend in production of clingstone varieties is upward for the next few years, whereas the production trend of freestone varieties is expected to continue to decline. In most other peach-growing areas only moderate changes in production are in prospect.

Grapes: The probability of heavy grape production continues. With favorable weather conditions, the grape acreage is still large enough to produce a crop of sufficient size to cause difficult marketing conditions. It is believed that the bearing acreage of table and raisin grapes in California has passed the peak and is declining. However, additional immediate reduction is recommended. Most of the States producing American-type grapes are at present showing no tendency to increase acreage, although Arkansas has probably not yet reached its peak of bearing acreage. Growers in these States, particularly New York, Pennsylvania, Ohio, Michigan, Missouri and Arkansas, should not plant new acreage, unless they are located in a district which because of very favorable marketing conditions, such as large nearby markets and ability to market by motor truck, provide good outlets at low delivery costs.

Citrus: The 1930 outlook indicates, as did those of the four previous years, a considerable increase in the bearing acreages of oranges and grapefruit. Many trees now in bearing have not reached the age of maximum yield and a large increase in production may be expected in years when favorable growing weather prevails. The bearing acreage of lemons has not shown any pronounced change since 1921; a slightly downward trend is now indicated, but production is on a high level and the industry still is confronted with difficult marketing problems.

Strawberries: Prospects for strawberry growers now seem to be better than in any year since 1926. With material decreases of acreage among the second-early and intermediate sections and only a moderate increase for picking in 1930 in the early States, the marketing problem should be greatly relieved this season, provided that yields are not above average and that the ripening periods are normal. Not only are smaller acreages in prospect for 1930, but there is a likelihood of lower yields per acre in some districts. Old fields in a number of areas are in relatively poor condition, because of drought last season and due to lack of care as a result of low prices. Tentative reports indicate little change in the 1930 acreage in the late States, as compared with recent years.

Berry Acreage Reduced

PRELIMINARY figures show a net reduction of about 16,000 acres or 8% from last year's total strawberry acreage. Practically all of this reduction is indicated in four States—Arkansas, Missouri, Kentucky and Tennessee—where about one-fourth of the commercial strawberry crop is grown and where prices have been relatively low and marketing conditions most unsatisfactory. The indicated total of 184,000 acres for harvesting in 1930 appears to be fairly well balanced among the various producing groups. Further expansion of acreage in the early States does not seem advisable, since the price tendency has been downward during recent years when acreage was increasing. In the second-early and intermediate States, the indicated area for picking in 1930 should, with normal yields, result in as large a crop as can be marketed to advantage. However, in some of these States many of the old fields are now in poor condition and should be replaced with new plantings in the spring of 1930. The present acreage in the late States can well be maintained.

By February 8, Florida had shipped a total of 550 cars of berries, compared with 310 by the same time last season. Total output of that State for the 1928-29 season was 1635 cars. Price declines were noted during early February, as shipments began to increase again. City jobbing sales were mostly at 35-60c on a quart basis, or 20-30c per pint. The 24-pint crates sold in some markets at $5-$6.75.

Good Prices for Citrus

TEXAS grapefruit, of the Marsh variety, was selling in Kansas City at $5.25-$5.50 per box, as against Florida receipts at $3-$5 in several cities. Some of the Florida fruit was of inferior quality or condition. Oranges from Florida jobbed at a wide range of $2.75-$6 per box. Kansas City reported California Navels at $4.25-$8.

Shipments of grapefruit had decreased to a daily average of 80 cars, mostly from Florida. The Texas season was nearing an end. To date, Texas has forwarded 3500 cars, or more than twice last season's record. Mixed citrus shipments from southern Texas total another 500 cars, compared with 185 all of last season. And about 150 carloads of oranges came from that area, or five times as many as last year. Total orange movement was still running about 1500 a week, chiefly from California and Florida. Arrivals of citrus fruit from Porto Rico have been much heavier than last

season, and Cuba also has been moving grapefruit very actively to this country.

Outlets Increasing

FOREIGN countries are becoming a more important outlet for American citrus fruits than ever before. The British market is especially favorable, though prices this season have been depressed by the large arrivals of low-grade Spanish fruit. Last season about 1,500,000 boxes of oranges were shipped to foreign markets, exclusive of Canada. Total grapefruit exports amounted to nearly a million boxes. Canning of grapefruit also increased the market outlet. About 957,000 cases were packed during the past season, compared with 455,100 in 1927. In addition, canners put up more than 200,000 cases of grapefruit juice.

Apple Movement Waning

WITH the approach of spring, apple shipments gradually decrease. By early February, about 85,000 of the expected season total of 100,000 cars had already been moved. Totals for eastern and western areas were nearly alike, with only a slight advantage for the East. Washington was still shipping about 100 cars daily, the Virginias about 50 each day, and New York about 40 cars.

Prices held fairly well at important shipping points, with best New York Baldwins selling on an f.o.b. basis at $2 per bushel basket or $5.50 per barrel, and Rhode Island Greenings returning $7. Extra Fancy, medium to large Winesaps touched $2 and Delicious $3 per box in Washington producing sections.

On the auction at Liverpool, England, apples with good color and bright appearance have been bringing a premium. Albemarle Pippins from Virginia met a strong demand and reached $9 a barrel. Supplies of barreled fruit were rathed moderate at the opening of February, so that prices generally advanced. Washington boxed Winesaps were in excess of requirements, but other western varieties were limited. Heavy receipts of deciduous fruits from South Africa were reported in Liverpool. First shipments of the large crop of Australian and New Zealand apples were expected in mid-February. Exports from United States and Canada during the last week of January were about 80,000 barrels and 65,000 boxes. The season's exports to February 1 were 2,270,550 barrels as against 2,963,820 a year ago; and 4,649,345 boxes, compared with 8,150,080 by the same time in 1929.

February Storage Holdings

AT THE opening of February, public cold-storage houses in the United States reported on hand 1,316,000 barrels, 10,152,000 boxes and 4,007,000 bushel baskets of apples. Combined holdings under refrigeration were 12% less than last year's stocks at this time and 5% below the five-year average for February. Barrels were in 22% lighter supply than a year ago and 44% below average. Boxes fell below the 1929 record by 18%, but were 2% more plentiful than the five-year average supply for this month. Nearly 70% of the boxes were still held in Pacific Coast States. Holdings in baskets were 25% greater than last winter and 97% above the average figure.

Vermont Apple Crops

FORTY ANNUAL crops of apples in Vermont total more than 70,000,000 bushels. This is about 70,000,000,000 individual apples. The largest crop on record was in 1916, when the total for the State was 3,312,000 bushels, but the commercial crop was 1,136,000, a little more than one-third of the total for that year. The years of greatest production were 1896, 1900, 1904, 1914, and 1916, when more than 3,000,000 bushels were grown. The commercial orchard industry has become established in Vermont.

The smallest crop on record for Vermont was the one for 1923, which was 521,000 bushels, with a commercial proportion of 267,000 bushels.

The decreased production for the last nine years is easily explained, for it dates back to the cold winters of 1917 and 1918 when so many old orchards were killed out and new orchards had not reached commercial bearing age. Even now nearly 200,000 trees of rather recent planting are not of fruiting age. This is a transition period, between the passing of the old and the coming of the new.—*M. B. Cummings, Vermont.*

TOP PRICES *for* FANCY PRODUCTS

"Significant among recent developments in agricultural marketing is an increased demand for the higher-quality products. Such products bring higher premiums over ordinary or low-grade commodities than they formerly did. In fact, the lowest grades of some products are disappearing from the markets, as no longer worth handling."

—*U. S. Secretary of Agriculture*

$3.16 *higher crop value* FOR EVERY $1.00 *spent on fertilizer*

REPORTS of results from fertilizer were gathered in 1929 from 48,000 farms in 800 counties of the principal agricultural states. Fruit and vegetable growers stated that for every $1.00 spent for fertilizer they got $3.16 higher crop value than they had ever averaged without fertilizer!

Nitrogen is the element in fertilizer that promotes growth. Orchardists and farmers who grow for the highly competitive markets, therefore, are quick to appreciate and apply the extra growth element that only a properly timed top-dressing can supply.

Every Spring, when the buds begin to swell, they fertilize the soil around the lower branches of each tree with Arcadian Sulphate of Ammonia.

Arcadian, used as a top-dressing, supplies an extra amount of *nitrogen*—the growth element—just when the crops need it most. Arcadian is rich in nitrogen (20.56% guaranteed). All soluble, all quickly usable. It is fine and dry—easy to put out—and one application lasts through any ordinary growing season.

To be sure of your supply of Arcadian Sulphate of Ammonia, place your order early with your fertilizer dealer. Orchardists everywhere are invited to write The Barrett Company for information in nitrogen fertilizer problems.

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Sulphate of Ammonia

NITROGEN *is the* GROWTH ELEMENT As essential as sunshine to growing crops. Be sure your crops get plenty of nitrogen both in the complete fertilizer you use and as top-dressing.

NO HILL TOO STEEP — FRUIT-FOG HAYES SPRAYERS — NO SAND TOO DEEP

Follow safely wherever team or tractor travel; light traction in deep sand or mud. Short turn for close work.

4 sizes—100, 150, 200, 300 gallon tanks with 1 to 3 gun capacities. All have famous "Fruit-Fog" guns—reach topmost branches with mist-like spray that drifts into every niche where air can go. Thousands claim HAYES are best. 50 years of pump building experience back of every one. 1930 model "Fruit-Fog" guns have Monel metal discs (last 6 times longer). Don't buy until you read HAYES free literature, showing 50 styles in hand and power types. Write for it.

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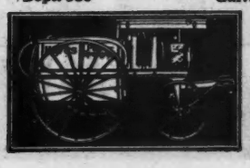


HAYES Master Pumps

Heavy duty for stationary spraying. Capacity 8-40 gal. per minute. Pressure, 400-600 lbs. Write for facts.

500,000 Farmers

Have Borrowed from the 12 Mutual Federal Land Banks a Billion and a Half Dollars at an average interest rate of 5.4%

THIS $1,500,000,000 in long-term loans secured by first mortgages on their farms provided much needed capital during a period when funds were scarce and the average farm income low. All but a small percentage of these farmers have met their obligations. The 12 Banks have total capital, legal and other reserves and undivided profits aggregating more than $84,000,000. Their total assets exceed $1,300,000,000. The net carrying value of the real estate, sheriffs' certificates and similar items owned by the 12 banks on November 30, 1929, was only 1.1% of their assets.

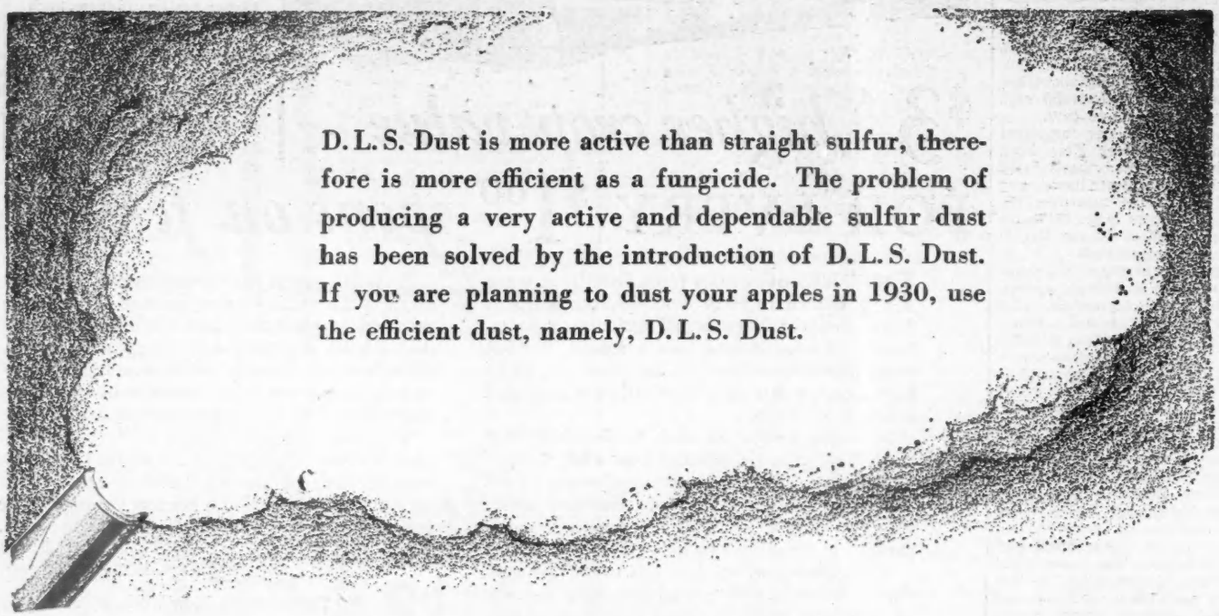
The services of the 12 Banks and the National Farm Loan Associations through which the loans are made have been of inestimable benefit and they will increase in the future.

The 12 Federal Land Banks are located at

Springfield, Mass. Baltimore, Md. Columbia, S. C. Louisville, Ky. New Orleans, La. St. Louis, Mo. St. Paul, Minn. Omaha, Nebr. Wichita, Kan. Houston, Tex. Berkeley, Calif. Spokane, Wash.

Ohio O. K.'s D.L.S. Dust!

D. L. S. Dust was endorsed at the 1930 Ohio State Horticultural Society Meeting as the most efficient Sulfur Dust ever developed for use on apples



D. L. S. Dust is more active than straight sulfur, therefore is more efficient as a fungicide. The problem of producing a very active and dependable sulfur dust has been solved by the introduction of D. L. S. Dust. If you are planning to dust your apples in 1930, use the efficient dust, namely, D. L. S. Dust.

D. L. S. Dust is the famous original Dry Lime Sulfur in a wonderfully convenient easy-to-handle *dust* form. It consists of 15% finely ground Dry Lime Sulfur, 85% 300 mesh dusting sulfur. It is better than all other sulfur dusts because:

1 The finely ground Dry Lime Sulfur is in itself active and therefore activates the dusting sulfur to make it more toxic to apple scab and other fungous diseases.

2 Has better adhesion to fruit and foliage than other dusts.

3 Produces better color and finer finish than any other sulfur dusts.

4 Sherwin-Williams Dry Lime Sulfur is patented under U. S. Patent No. 1,264,908, January 29, 1918. Reissue Patent No. 14,890, June 22, 1920.

Apple growers everywhere, who dust, will welcome this news with great enthusiasm because it means far finer fruit with better color and smooth waxy finish. That's the kind of fruit that brings top prices.

D. L. S. Dust is the last word in efficient operation as well as handling. It comes to you packed in either 100 or 200 pound drums. It positively cannot burn fruit or foliage, cannot deteriorate or clog your duster nozzle. Once you use it, its merits will delight you as they have hundreds of leading growers who insist upon it for real economy and lasting efficiency in the field.

SHERWIN-WILLIAMS
SPRAY AND DUST MATERIALS

For Fine finish and color use S-W Dry Lime Sulfur (THE ORIGINAL) or D.L.S. Dust

Read what these users say about actual results!

Grow the kind of fruit that pays you most—waxy finish, fine color! It's easy enough if you follow the simple method used by leading growers who insist upon Sherwin-Williams Dry Lime Sulfur and D.L.S. Dust!

If you spray or if you dust, Sherwin-Williams offers you the most efficient, easy-to-handle product in either case.

If you spray

For fine waxy fruit—positive control of russeting and Scab, use the Original Dry Lime Sulfur. This old favorite among the country's leading growers has no equal. You pay no freight on water. No fuss in mixing. No nozzle clogging. No waste. Can't burn foliage, can't deteriorate. Easy to handle and powerful in action.

If you dust

Use this new Sherwin-Williams D. L. S. Dust either with or without Arsenate of Lead. It comes to you after exhaustive tests made by the Ohio Agricultural Experimental Station. Results obtained showed that among apples dusted with D. L. S. Dust only 4.4% apple scab was present, whereas 23.9% of the apples on which a 300-mesh sulfur was used were scabby.

Prepare for your spraying needs now

See your local Sherwin-Williams dealer. He will help you solve your problems to turn out extra large pack-out of extra fancies.

Send for full information

Write us for valuable information on Sherwin-Williams Dry Lime Sulfur and Mulsoid-Sulfur, discussed particularly for the commercial grower. The Sherwin-Williams Co., Dept. 703, 601 Canal Road, N. W., Cleveland, Ohio.

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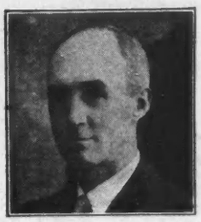
These users swear by S-W Dry Lime Sulfur!



Replying to yours of the 16th would say that I have used your Dry Lime Sulfur for the past two seasons and like it better than liquid as there is no burning and the material is very convenient to handle.

The size package, 12½ lbs., is all right for me as *I am using 25 lbs. in 400 gal. Summer Spray of water.*

Very truly,
PAUL JUDSON,
Judson Farm, Kinderhook, New York

The Marshall Farm Orchards consisting of 6500 trees of McIntosh, Baldwin, Delicious, Wealthy, and Gravenstein have been sprayed with Sherwin-Williams Dry Lime Sulfur for the past fourteen years.

The control of Apple Scab, on McIntosh and Delicious, particularly, during this period has been uniformly successful and the finish of the fruit has been splendid due to the absence of russeting.

The convenience and ease of handling your Dry Lime Sulfur has also appealed to us.

Yours very truly,
GEORGE A. MARSHALL,
Fitchburg, Mass.

Convenient 12½ lb. bag

I have personally used Sherwin-Williams Dry Lime Sulfur for the past years and attribute the fact that my apples are free from russet and have a fine color and finish to the use of your product.

It is generally conceded by all progressive and up-to-date fruit growers that there is no material made that gives better finish to apples or control of apple scab when used as a summer spray than Sherwin-Williams Dry Lime Sulfur.

Very truly yours,
W. H. CONANT,
Member of Main Experimental Station Council,
Buckfield, Maine

Mulsoid-Sulfur especially for peaches

Peach growers praise this new Sherwin-Williams product. It prevents brown rot and scab. Mixes easily and evenly in water. Write for full information.

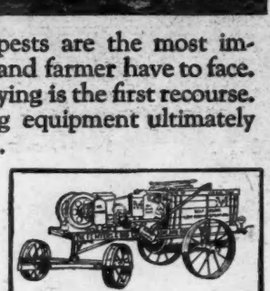
SHERWIN-WILLIAMS SPRAY AND DUST MATERIALS

INSECTS, fungus and bacterial pests are the most implacable enemies the orchardist and farmer have to face. Against these threats, scientific spraying is the first recourse. Upon the quality of your spraying equipment ultimately depends the amount of your profits.

MYERS Hand and Power Spray Pumps

Not until you study the MYERS catalog can you realize the extent and variety of assistance which the MYERS line offers in helping you meet your spraying problems at lowest cost and with the greatest efficiency. Whether you plant a kitchen garden and tend a few trees or operate big orchards and broad commercial acres, MYERS offers the exact type and size of spraying equipment suited to your needs.

Spray pumps, spray rigs, and spray equipment—big Engine Powered types, hand operated Barrel types, Portable Wheeled types, small Tank types, Knapsack types and Bucket types—the MYERS line includes them all. Write today for free catalog and name of nearest MYERS dealer.



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Here's a simple way of insuring yourself against the hazards of inferior nursery stock:

First, turn to page 29 of this issue, to the Advertisers' Index. Under the heading of "Nursery Stock" will be found the names of a number of nursery concerns whom we know to be reliable. Read those advertisements—they contain interesting information for you.

Next, write for their catalogs. A postal card will do, but a letter, telling approximately what you intend to plant, will be better.

Then, wherever you place your order, you are certain of starting right.

Or, for your convenience, we will do it for you, though it will take a few days longer.

Check below the items in which you are interested and we will forward your request to these nurserymen. Mail this coupon to

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Buyers Service Bureau 53 W. Jackson Blvd., Chicago

I am interested in getting prices on the following plants:

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☐ Strawberry	☐ Currant	☐ Blackberry	☐ Plum
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☐ Blackcap	☐ Raspberry	☐ Ornamentals	☐ Grape

☐ Other Stock (State kind).....

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Address .....

Calcium Sulphide--A New Fungicide

By R. H. HURT

Virginia Agricultural Experiment Station

EVERY SUCCESSFUL fruit grower of today knows that his fruit must be protected from insect and disease pests if he expects to harvest a profitable crop. In order to do this, he knows that it is necessary to spray; but when it comes to the point of knowing what spray material to use he is usually stumped. He knows from past experience that spraying with the standard materials, such as lime-sulphur and Bordeaux mixture, usually results in more or less spray injury. The age-old problem then of finding a material that will control diseases and insects without causing injury to fruit or foliage still remains an important one for the fruit grower, and he continues to call upon his scientific brothers, the pathologist and horticulturist, for relief. His scientific brothers have, therefore, been at work on this problem for years, and recent developments are very encouraging.

After four years' experimentation with different materials, the Virginia Experiment Station announces the discovery of calcium sulphide (also called calcium mono-sulphide) as a very promising fungicide for both apples and peaches. In addition to possessing high fungicidal value and a minimum of caustic or burning properties, this material can be used throughout the spray season in either hot or cool weather in combination with the commonly used insecticides such as lead arsenate and nicotine sulphate.

It must be understood, however, that calcium sulphide is not offered to the fruit grower as a panacea or cure-all; but it does have certain commendable properties. Experiments conducted under conditions prevailing in Virginia during the past four years have shown calcium sulphide to be (1) a very effective fungicide, (2) non-caustic to fruit and foliage, and (3) the best carrier of lead arsenate used to date.

Experimental Results

THE results obtained in our tests with calcium sulphide have in all cases been as good as, or better than, those obtained with the standard spray materials, such as lime-sulphur, Bordeaux mixture, dry-mix sulphur lime, and self-boiled lime and sulphur. Both apples and peaches have been included in the tests. The tests were conducted under extremely severe conditions of disease infection. The fruit from the check or unsprayed plats in most of the orchards developed 100 per cent scab infection in the case of both apples and peaches. It is reasonable to conclude, therefore, that calcium sulphide, having given satisfactory scab control under such severe conditions, must have real merit as a fungicide.

The tests with calcium sulphide have involved the use of two grades of material, namely, the U. S. P. crude calcium sulphide and a commercial calcium sulphide, a product prepared especially for spraying purposes and sold under the trade name "Cal-Mo-Sul." The U. S. P. material was used in the 1926 and 1927 tests, and the commercial preparation in 1928 and 1929. The results in 1926 and 1927 were very good and led to the production of the commercial product which was used in the 1928 and 1929 experiments. We are, therefore, most interested in the results obtained during the past two years.

During the season of 1928, a total of 10 tons of calcium sulphide was used by experiment station workers and fruit growers in the State of Virginia. Large blocks of Winesap, York Imperial and Ben Davis apples were sprayed throughout the summer season. In most of these tests the material was used at the rate of 10 pounds to 50 gallons of water on apples, and six pounds to 50 gallons of water on peaches.

In 1929 a total of about 25 tons of calcium sulphide was used in the State by experiment station workers and commercial growers. The season offered an excellent opportunity for the study of the fungicidal and non-caustic properties of calcium sulphide, as well as its value as a corrective of arsenical injury on apples and peaches.

In the 1929 tests, large blocks of both apples and peaches in commercial orchards were sprayed with calcium sulphide as a complete summer fungicide, following the Virginia spray service schedule. Two commercial peach orchards consisting of 4000 trees received this material as a complete summer fungicide. In these experiments and in the commercial orchards, the calcium sulphide was used at the rate of six and one-fourth pounds to 50 gallons of water on both apples and peaches. Lead arsenate was used in the above applications if called for by the spray service.

A Very Effective Fungicide

IN SUMMING up the 1929 results, it will suffice to say that calcium sulphide has been equal and in many cases superior to the standard sulphur sprays as a fungicide, and very much better from the standpoint of being non-caustic or causing little or no spray injury. The average scab infection on such scab susceptible apple varieties as Winesap has been approximately 3.5 per cent on the plots sprayed with calcium sulphide plots as compared with about four per cent on the lime-sulphur and dry-mix plots, while the checks or unsprayed trees developed 100 per cent scab infection on both fruit and foliage.

The results on peaches have been equally as satisfactory as those on apples in the control of fungous diseases, and as a corrective for arsenical injury on peaches calcium sulphide has proved superior to any other material used. Where calcium sulphide was substituted for hydrated lime in the petal fall and shuck applications of lead arsenate on peaches and continued as the fungicide for the remainder of the season, the fruit was harvested in excellent condition and the amount of arsenical injury to the foliage and twigs was negligible.

It seems that the results obtained thus far should be ample to prove that calcium sulphide is an effective fungicide under Virginia conditions for both apples and peaches. On the other hand, the writer would not recommend this or any other material in a wholesale way to growers of another fruit section until it has been shown to be effective under conditions prevailing in that particular section. There is no apparent reason, however, why calcium sulphide should not be equally as effective in other States as it is in Virginia; and the results which have been obtained by other experiment station and field workers indicate that this material is an effective fungicide under a wide range of conditions.

Description and Preparation

CALCIUM sulphide has been made in a small way for over 200 years. It has largely been used by the medical profession as a hair remover and in the treatment of skin diseases, both externally and internally. It is sold to the drug trade under the name of U. S. P. crude calcium sulphide. The U. S. P. material occurs as a very light gray powder and the commercial product which is now available as a spray material is a dark gray powder.

The process involved in the manufacture of calcium sulphide is one of chemical reduction, and considerable chemical knowledge, as well as lots of machinery, is necessary for its production. It is, therefore, obvious to the fruit grower that he cannot prepare his own material but will have to buy it of some manufacturing plant. The materials used in the manufacture of calcium sulphide are anhydrous calcium sulphate (gypsum) and carbon in the form of coal or coke.

Properties of Calcium Sulphide

THE data collected throughout all of our trials indicate that calcium sulphide is remarkably free of caustic prop-

erties with a high degree of toxicity to fungous diseases which are controlled by sulphur sprays. Calcium sulphide is a sulphur type spray and is not intended to replace Bordeaux mixture in the late summer applications on varieties of apples which are susceptible to bitter rot. The material has the unusual advantage of being applicable to both apples and peaches as a summer fungicide.

One of the outstanding features of the material is that it has proved to be an excellent carrier of lead arsenate. Tests have shown that it will greatly reduce arsenical injury to peach twigs and foliage if used in all of the lead arsenate applications. Arsenical injury to peach twigs is more or less accumulative and in order to check this injury, preventive measures must be taken in all of the lead arsenate applications. Tests have further shown that calcium sulphide will largely prevent arsenical injury on the apple and especially on such varieties as the Ben Davis. There is not the characteristic reaction between calcium sulphide and lead arsenate that there is between lime-sulphur and lead arsenate; therefore, it is not necessary or desirable to use extra lime with calcium sulphide and lead arsenate.

When calcium sulphide is applied to the tree as a spray it undergoes a slow decomposition, forming hydrated lime and calcium hydro-sulphide. If hydrated lime is used in combination with calcium sulphide, it prevents, to a marked degree, the dissociation of this material into hydrated lime and calcium hydrosulphide, and thus partially eliminates its power of taking up water soluble arsenic. The addition of hydrated lime, however, does not seem to interfere with its fungicidal value, nor does it seem to increase it.

The ease in which calcium sulphide may be handled in the orchard is a commendable characteristic. A suspension of it may be easily obtained in water. The required amount is weighed out and placed in the tank and the water added or it may be washed in by the inflowing water. When lead arsenate is used with calcium sulphide, it may be added either before or after the calcium sulphide has been added.

Summary

CALCIUM sulphide ("Cal-Mo-Sul"), when mixed at the rate of six and one-fourth pounds to 50 gallons of water, is an excellent fungicide for the control of apple and peach diseases.

Calcium sulphide is remarkably free from caustic or burning properties as shown by the fact that peach foliage and twigs are not injured by it. It can be applied in either hot or cool weather to varieties of apples as susceptible to spray injury as Ben Davis without fear of injury.

Calcium sulphide should not replace Bordeaux mixture in the late summer sprays in orchards where bitter rot is an important disease.

Calcium sulphide is especially valuable in apple orchards interplanted with peaches because the same spray material can be used for both of these fruits.

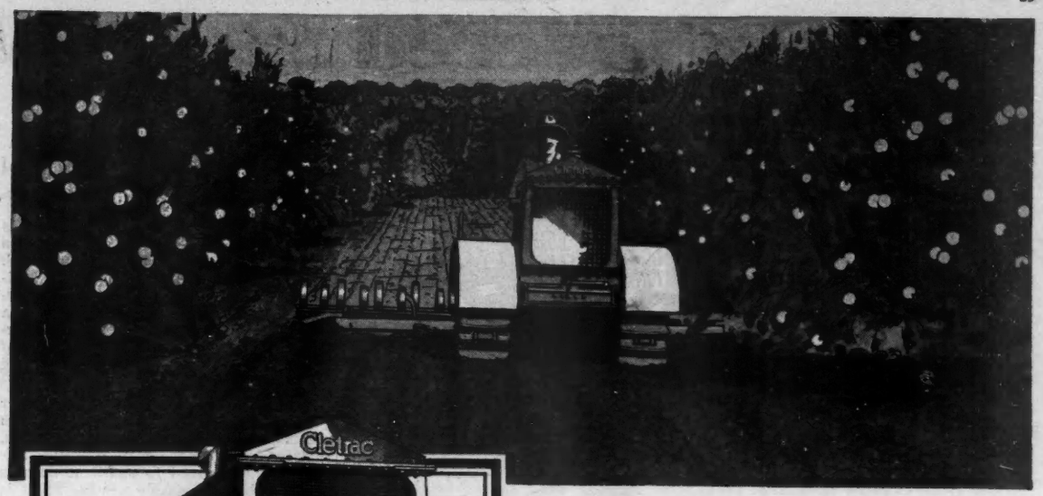
Calcium sulphide is a good carrier of lead arsenate; it prevents arsenical burning to a large extent. No excess of lime should be added when lead arsenate is combined with calcium sulphide.

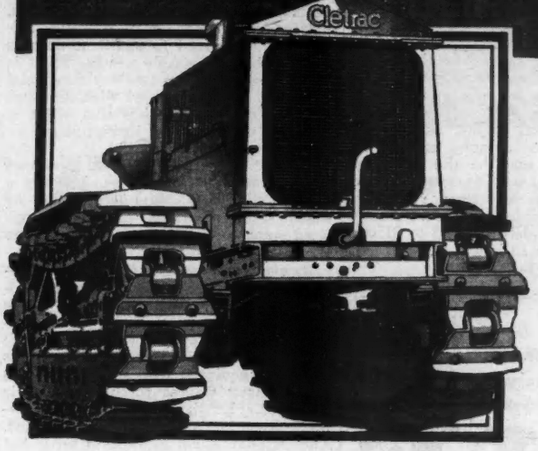
Calcium sulphide can be stored indefinitely in a dry place without deteriorating. The material is very easily handled in the orchard.

Dr. Bomberger to Direct Organization Work

THE APPOINTMENT of Dr. Frank B. Bomberger as assistant chief of the Division of Co-operative Marketing in charge of organization work for a period of one year from February 1, 1930, to February 1, 1931, has been announced by the Federal Farm Board. Dr. Bomberger will retain his official title and connection with the University of Maryland.

The appointment is the result of a co-operative arrangement between the Farm Board and the University of Maryland whereby the former will have the use of Dr. Bomberger's services to direct its organization work on a part time basis.





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Lower in price than any other 20 h. p. tractor — amazingly low in its cost of operation—this rugged, powerful Cletrac "20" is an unequalled money-saver and money-maker!

Power for your heaviest loads—sure-footed traction that walks lightly and pulls surely over loose or muddy soil—underslung weight that puts safety and efficiency into hillside work—endurance that only fine steels and a perfect motor can provide! That is a part of the story of this greatest of all orchard and farm tractors. Add to these features the small cost of owning and operating a Cletrac 20 and you are squarely confronted with the fact that here is *the most extraordinary tractor value ever offered.*

Cletrac power is *profit power*—as thousands of growers have proved in every great fruit section of the country. It is speedy, durable, economical power that makes your work move swiftly and that puts a large part of your former expense on the profit side of the ledger.

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Calcium-Mono-Sulphide

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FOR APPLES AND PEACHES

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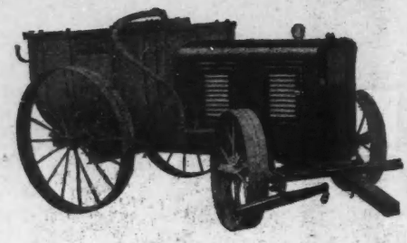

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Flotation Sulphur for Fruit Diseases

By M. A. SMITH

Crop Protection Institute

LIME-SULPHUR as a fungicide has remained one of the standard sprays since its first use in Oregon in 1908. Owing to the fact that it may cause serious foliage and fruit injury under certain climatic conditions, there has been a demand in recent years for a spray material which combines the high toxicity of lime-sulphur with the safety of ground wettable sulphur sprays.

Practically all of the native sulphur produced is mined by melting it with steam in the rocks in which it occurs, and forcing it to the surface. Such sulphur, which ground to sufficient fineness and to which a suitable wetting agent is often added, may be used for fungicidal purposes. It may be used with safety as a spray at high temperatures when it would be unsafe to use lime-sulphur.

RECENTLY there has been developed in the manufactured gas industry a process known as liquid purification by which large quantities of pure precipitated sulphur are obtained. This process is essentially as follows:

Raw gas as it comes from the carbonization process contains hydrogen sulphide and other impurities. The gas is passed through a specially prepared chemical solution. This solution absorbs the hydrogen sulphide and is led into tanks which are equipped with submerged pipes having many orifices through which air is forced. In the concentration resulting, elemental sulphur is precipitated. This sulphur is not allowed to settle but is forced to the surface by air bubbles which attach themselves to the sulphur particles. The result is a separation and flotation of the sulphur in the form of a froth or foam. The sulphur froth may become six to 18 inches deep and contains from six to 12 per cent sulphur.

A sufficient air pressure is maintained in the system to force the froth to overflow into troughs. In the trough the froth subsides through the formation and release of the larger air bubbles, leaving a creamy slurry which flows into a pit or tank. The slurry is then pumped into filter presses where the sulphur is recovered as a wet cake having about 50 per cent water. Any impurities of the sulphur cake are easily washed out, leaving a pure sulphur cake.

SULPHUR obtained by this general process has been designated Flotation sulphur. There are three types, known respectively as Thylox, Ferrox, and Gray. These do not differ from one another insofar as the characteristics of the sulphur particle are concerned. The particle size of these types is exceedingly fine and as a result the sticking qualities are excellent. Because of these characteristics, laboratory and field experiments to determine its fungicidal properties have been conducted in Illinois since 1927. Lack of space does not permit any detailed discussion of such experiments. A brief resume of some of the results obtained may be given here.

In spraying experiments in southern Illinois, these three types of Flotation sulphur used in comparison with certain ground wettable sulphurs gave superior control of peach brown rot. This material was also used satisfactorily by a number of commercial peach growers in southern Illinois.

In 1929 a series of experiments were carried on in the western part of the State to test the efficiency of Flotation sulphurs for the control of apple scab, and to observe the effect of the different sprays on the foliage of the trees and on the finish of the fruit. The spraying was carried on in a block of 26-year-old Ben Davis apple trees. The spray plots each contained 20 trees. Each treatment was triplicated. Plots receiving similar treatments were located in widely scattered portions of the orchard. This precaution was taken to correct as nearly as possible any difference in scab severity which might occur in certain sections of the orchard. At harvest time, a thousand apples were picked from different portions of four center trees of each plot, and the percentage of scab estimated.

THE results showed that apple scab was satisfactorily controlled in all plots receiving Flotation sulphur. Over 90 per cent of scab-free fruit was obtained in all plots receiving these sprays, while in the untreated plots 95 per cent of the fruit was severely scabbed.

The finish of the fruit and the condition of the foliage in the plots where Flotation sulphur sprays were used was superior to that obtained in the plots sprayed with lime-sulphur. The lime-sulphur-sprayed plots averaged about 96 per cent scab-free fruit. They gave slightly better scab control than the Flotation-sulphur-sprayed plots; however, there was some russeting of the fruit, due to the lime-sulphur, and there was also some defoliation.

EXPERIMENTS have been carried on during the past three years for the control of peach leaf curl and San Jose scale with a combination of Flotation sulphur and an experimental oil emulsion as a dormant spray. Such a combination has proved to be very satisfactory from the physical standpoint, and in tests in southern and central Illinois it has been shown to be a very efficient fungicide and scalecide. No injury of any nature has been observed on the trees receiving this combination dormant spray.

During 1929 experiments for the control of cherry leaf spot were carried on. In one experiment, Flotation sulphurs were used in comparison with lime-sulphur in a commercial cherry orchard. In the rows receiving these sprays no noticeable defoliation and practically no yellowing of leaves occurred. In unsprayed rows almost complete defoliation due to this disease had occurred by midseason. No spray injury of any nature was obtained in the rows receiving Flotation sulphur.

Another experiment was conducted in Illinois on the control of cherry leaf spot in cherry seedlings in the nursery. Flotation sulphur and Bordeaux mixture were the sprays used. The results of this experiment showed that satisfactory control of the disease was obtained with both of these spray materials.

The results of these two experiments showed that Flotation sulphur may be used satisfactorily to control cherry leaf spot in the commercial cherry orchard and on nursery stock. It may be used to advantage particularly in the commercial cherry orchard at a time during the season when it is unsafe to use lime-sulphur.

AS A RESULT of numerous tests of Flotation sulphur, it seems that it will fill a long felt want on the part of growers for a safe sulphur spray possessing high fungicidal value. It has the advantage of being perfectly safe for peach spraying when used at the rate of six to eight pounds to 100 gallons (dry sulphur basis). It is excellent for those varieties of apples especially susceptible to spray injury from lime-sulphur and which are moderately susceptible to scab.

Dr. Ezekiel Appointed Asst. Chief Economist

APPOINTMENT of Dr. Mordecai Ezekiel as assistant chief economist, effective February 1, 1930, has been announced by the Farm Board. Dr. Ezekiel has been associated with the Bureau of Agricultural Economics since 1922, as agricultural economist, in the development of methods of statistical analysis and their application to problems of farm management, agricultural economics and prices of agricultural products. He is a native of Virginia, and received a Ph.D. degree at the Robert Brookings Graduate School in 1926.

Orcharding in the Shenandoah

By W. L. MYERS

ABOUT 30 years ago there were very few apple growers in the Shenandoah-Cumberland valleys, and grain and livestock farming were the only types of agricultural enterprises practiced. Like many other industries, the initial years were marked by many jumping into the business of apple growing without sufficient consideration of the factors that go to make successful orchards possible. In many cases, apple trees were planted on land unsuited to apple production and many failures resulted. However, the industry grew by leaps and bounds until today there are two adjoining counties in this region which ship approximately 2000 cars of apples each. These are Frederick county, Virginia, in which is located the city of Winchester, and Berkeley county, West Virginia, the county seat of which is Martinsburg. Augusta county, Virginia, ships over 1000 cars annually.

The most important varieties in this region are York Imperial, Ben Davis, Winesap, Stayman, Delicious, Bonum, Grimes, Rome. In 1923 the Yorks made up 40 per cent of the total. There are a number of less important varieties planted, and probably too many varieties are grown for the good of the industry. From 40 to 60 per cent of the crop is exported to England, France, and South American countries. The Albemarle Pippin is one of the most famous Virginia varieties but is grown mostly on the eastern slope of the Blue Ridge Range, which is really a part of the Piedmont section of the State.

MUCH of the soil used for apple orchards in this region is of the Hagerstown series, a limestone formation. However, there is a considerable variation in the soil types and in many orchards the rock formations are too near the surface for best results. Too little attention has been paid in many cases to maintaining the original fertility of the surface layers of soil, both as to organic matter and plant food content. Consequently, many orchards are yielding poorly.

Moisture is one of the most important, if not, indeed, the limiting factor in the production of orchard fruits. A fact frequently lost sight of is that this moisture factor must be neither too much nor too little and must be available at the right time. In other words, water must be there when the trees want it and in proper amounts. Here is where sods and cover crops count heavily. Legumes, such as red clover, should form at least a part of the seed mixtures sown for either sod or cover crop purposes, as they are splendid soil improvers and can be counted upon to supply the trees with a portion of their nitrogen. Of course, some additional nitrogen is generally profitable.

Many are applying too much nitrogen and this results in reducing the quality of the fruit, both as to color and as to keeping quality in storage or when shipped long distances, such as to the European markets. The fact that in many orchards the trees are planted too close makes it important not to stimulate the growth too much, and for these orchards, as well as those in which it is desired to build up the soil fertility and moisture-holding capacity, a complete fertilizer, such as a 7-6-5 or a 4-8-7 or an 8-8-6, giving the analyses in order of nitrogen, phosphoric acid and potash, would be beneficial. A number of growers are finding this to be the case.

THE Spotswood Orchards are a good case in point. This property was in rundown condition four years ago. When Mr. Bowers, the present manager, looked the situation over, he at once decided that the soil as well as the trees needed some attention. It was low in organic matter and that meant irregular moisture supply, and at times some soil washing occurred, although the land is only slightly rolling. It was decided to try the alternate sod-mulch and clean cultivation system, using red clover (medium) as the sod crop, and turning it under every other year. This makes each orchard block receive one year of sod, mulched, and one year of clean cultivation. As the trees become older it is intended to let the clover remain longer than one year.

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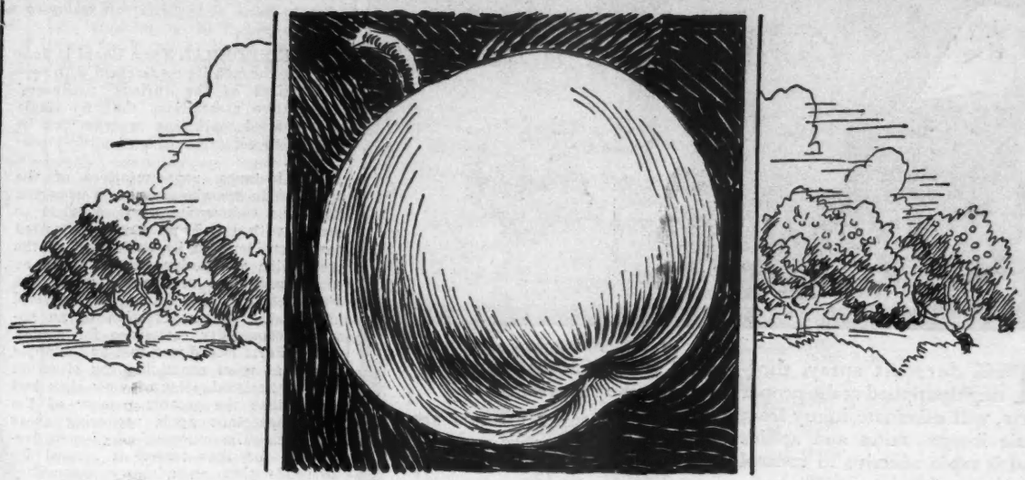

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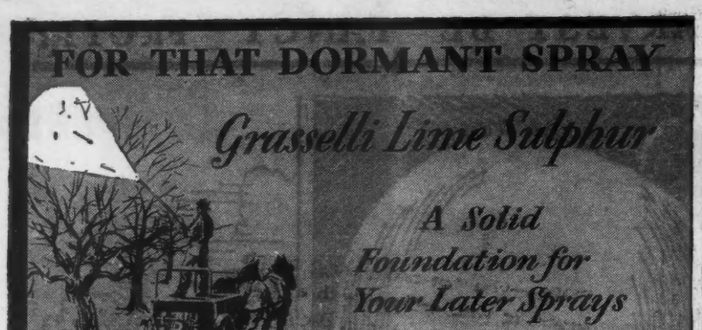

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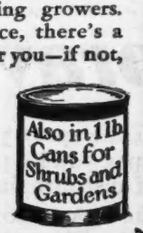

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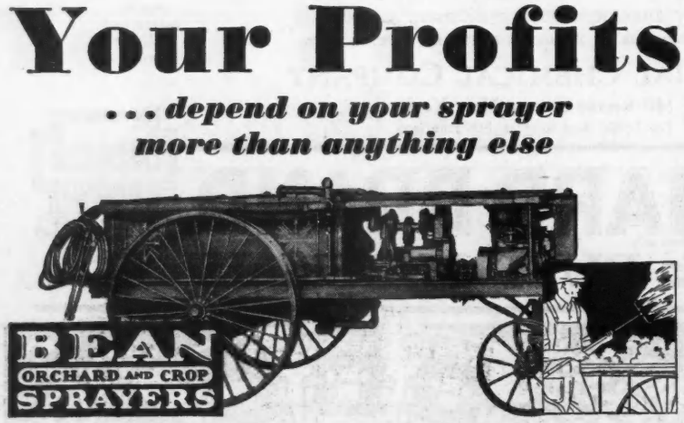

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No "Commodity Committee" for Apple Industry

By E. E. REYNOLDS
Washington Correspondent

THE FEDERAL Farm Board is finding through its conferences with representatives of the various producers' co-operative associations that no single cut-and-dried marketing program can be applied to all types of agricultural production.

For instance, representatives of the apple producers who came to Washington from the commercial apple districts to confer with the Farm Board requested early consideration by the Board of the recognition and designation of apples as a commodity to receive aid under the Federal Marketing Act, but advised against the present creation of an advisory commodity committee for apples.

The Farm Board was told by the apple men that upon examining the situation from a national point of view they had found that the greater number of the more important apple producing areas are at this time unorganized co-operatively and for that reason it seemed inadvisable that an advisory commodity committee be set up.

AT THE same time, however, they recommended that a general committee typical and representative of the various important apple growing regions be appointed to be composed of three representatives of the co-operative movement in each of the following four principal apple producing regions: (1) New York and New England; (2) Shenandoah-Cumberland-Southern; (3) Middle West; and (4) Northwest-California, and such other additional representatives as the Farm Board may wish to appoint from areas not hereby designated.

In the naming of the personnel of this committee it was suggested that in those general regions where existing co-operatives are co-ordinated into a general organization, such organization name its representative on the committee. In those unorganized regions they recommended that the Federal Farm Board invite the co-operation of State horticultural societies, agricultural colleges and the co-operatives themselves in selecting their members of the committee.

This committee is to have for its general purpose promotion and development of co-operative marketing organization work in the different apple growing regions of the country, and to this end it is to co-operate closely with the Farm Board. It is to serve as a means of contact with the Farm Board and can help such agencies designated by the Board to carry on such educational work as will assist in the forming of local and regional co-operative marketing associations.

THE apple industry representatives told the Farm Board that while it is impossible to anticipate fully the possibilities of action that may be covered by the proposed committee, they recognized the need for aggressive effort toward thorough development of co-operative thought and action in several of the important producing regions. They also called attention to the desirability and need for constructive work in those areas now already substantially organized. They suggested further to the Farm Board that for those regions already organized the extension of the credit facilities of the agricultural marketing act is immediately desirable, and that it constitutes the principal instrument for continued growth and strengthening of the co-operative movement in those regions.

Representatives of the apple industry in attendance at this conference were as follows: Victor C. Follenius, general manager, Apple Growers' Association of Hood River, Ore.; John D. Neff, representative, Fruit Growers' Co-operative Association; J. R. Everett, president, North Central Washington Growers' Association; W. W. Muffly, president, and Harry L. Miller, secretary, Skookum Packers' Association; Levi Tigner, president, and C. W. White, general manager, Wenatchee District Co-operative Association; I. H. Logue, president, and Noel Bakke, manager, Wenatchee-Okanogan Co-operative Federation; Fred Eberle, general manager, Yakima County Horticultural Union; J. W. Hebert, general manager, Yakima Fruit Growers' Association; M. C. Burritt, vice-president, Western New York Fruit Growers' Co-operative Association.

THE recommendations of the representatives of the apple growers were approved by the Federal Farm Board, and it is understood that steps are being taken looking toward the organization of the general committee as suggested by them.

Discussing the apple marketing problem, Alexander Legge, chairman of the Farm Board, gives his opinion that producers themselves can improve marketing conditions considerably by paying more attention to the handling of their products so that they will meet the needs of the consumer. He tells this true story to illustrate this point: In one of our good fruit sections in the eastern part of the United States he ran across a retail dealer who was selling apples that were grown on the Pacific Coast instead of offering apples grown within a few miles of his store. He asked the dealer why he was selling Hood River apples from Oregon instead of the locally grown fruit. The dealer stated that it was because they were more dependable; the brand on the box was well known to his customers, he knew just how many there were in the box, he knew what each apple cost, that every apple in the box was of a high grade, they were all alike, and he knew what he would have to charge for each apple in order to make a profit. He knew there were exactly 100 apples in the box and there were no culls to be thrown away. The dealer did not have the same insurance against losses where he handled locally grown fruit which was not carefully graded, packed and branded.

Orchard Fertilization

By R. E. STEPHENSON
University of California

TREE FRUITS are quite generally fertilized with good returns. Of the artificial fertilizers, however, very little is used except nitrogenous materials. Seldom is either phosphate or potash considered profitable on tree fruits.

The usual method of applying fertilizers in orchard practice is to scatter the treatment broadcast around the trees. Later the fertilizer may be worked into the soil by cultivation. This method of application works very well with nitrogenous materials. Even organic materials undergo nitrification quite readily and soon become available. Nitrates move rather freely in the soil and are carried to the roots of the trees very easily by the water which percolates downward.

This latter statement is not true of phosphate or potash, however. Phosphate in particular is so firmly and completely fixed by the heavier soils that movement from the point of application is very limited. When applied to the surface, therefore, it remains at the surface except as it is worked down mechanically by tillage. Tillage is usually not very deep. Very little or none of the phosphate moves below the cultivated depth. It does not, like the nitrates, follow the penetration of water.

THIS limitation of phosphate movement in the soil would have less significance if it were not that most trees are rather deep rooted. Some trees feed very little in the cultivated surface. Citrus fruits are believed to feed almost entirely below the surface six inches. Walnuts are very deep rooted and are slow to respond to fertilization by the usual methods. Figs, likewise, are decidedly not surface feeders and it is difficult to obtain response from fertilization.

It seems probable that many trees not only feed deeply, but they utilize a rather large volume of soil. This gives them greater drought resistance but makes it

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more difficult to obtain response from surface fertilization. There is, therefore, apparently great need for study of methods of fertilizing fruit trees. Shade trees have been successfully fertilized by dropping the fertilizer in holes placed about the tree 10 to 18 inches deep. Fruit trees could no doubt be fertilized by a similar method. Deep fertilization so far as it has been tried has been attended with good results.

FRUIT trees, because of their deep rooting habits, should respond especially favorably to deep fertilization. Roots in general go where there is available nutrient material, provided there is moisture. When fertilizer materials can be placed deeply, it will cause profuse root development about the fertilized zone at greater depth. Trees that are surface fertilized do not have a root system able to function to best advantage in dry weather. The fertilizer causes too much root development in what later becomes the driest soil zone.

It seems logical to encourage root development below the depth of cultivation and thus avoid some of the severe effects of drought. One experiment station is investigating a method for placing fertilizers deeply in orchards by forcing the solution into the soil through a perforated pipe. When results justify the effort, a means can be found for getting the fertilizer into the soil.

TOP dressing with fertilizer is perhaps the poorest method that can be used for any crop. To work a top-dressed fertilizer other than nitrates into the soil to any depth requires much mixing. In some soils this in itself is undesirable. Many of the heavier soils on which orchards are grown, and especially the "red hill" formations full of iron oxides, have a very high fixing power. With phosphates in particular this may become a serious matter, as the fertilizer is so completely fixed that the crop receives no benefit. The more thoroughly the fertilizer is mixed with the soil, the more completely it is fixed.

To avoid so much fixation, the fertilizer should be localized so that there is more fertilizer in spots than the soil can fix. This is accomplished when the fertilizer is dropped in holes about the tree. The soil about each deposit of fertilizer is soon permeated with a dense mass of feeding roots, which take the nutrient material as it comes into solution. If placed sufficiently deep that the soil is always moist, even dry weather will not prevent the tree from utilizing the fertilizer.

THE problem of methods of fertilizing orchards deserves much more study than it has received. Few crops give a higher return for effort expended. The method of application becomes especially important on those orchard soils which are in need of phosphate or potash fertilizers. Such investigations as have been conducted with other crops indicate that the difference in returns from the best and poorest methods of applying fertilizers may pay the cost of a liberal application of high grade material. When the "how" of fertilization is better understood, results will be attended with less uncertainty and the producer will be more willing to use the fertilizer which he himself feels that his crops ought to have.

Missouri Grape Industry Survey Completed

A SURVEY of the economic position of the grape industry in Missouri has been concluded at the Missouri Experiment Station and the results issued in Bulletin 273 by that station. F. L. Thomsen and G. B. Thorne, the investigators, declare that possibilities of obtaining better prices in Missouri are offered by improving quality, broadening markets and developing by-products. Copies of the bulletin may be obtained from the Missouri Experiment Station, Columbia.

The appointment of J. A. Evans as associate chief of the Office of Cooperative Extension Work, and of T. Weed Harvey as assistant chief of the office, has been announced by the United States Department of Agriculture.

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Success with Everbearing Strawberries

By B. W. KEITH

A FEW SUMMERS ago the writer had an interesting experience with a grower whose everbearing strawberries were proving to be a failure. Occasion afforded me an opportunity to visit this man's neighborhood, and I called to investigate the cause of his failure. There was just one cause, as I discovered later. The party was found at home, but asleep at three o'clock in the afternoon, at a time of the year when weeds are on the boom. He was not inclined to have anyone visit his strawberry field, but as that was what I was there for, we went.

Sure enough, the weeds were on the boom and crab grass was playing close second. He had excuses, but these excuses did not lessen the possibilities of success with those plants. When we get right down to facts, many of the adverse reports on everbearing strawberries can generally be traced to some preventable cause.

The growing of everbearing strawberries is much like dairying or other lines of farming—one man succeeds while just across the road another fails. In dairying, the thoroughbred cows are not the whole game. The dairyman must feed intelligently for greatest milk production. Just as soon as he lets down on feed, down goes the milk flow. Likewise with everbearing strawberries—the best of plants and varieties are not the whole game. They must be fed and cared for properly for profitable yields. A half-starved cow or plant is a failure. As you intelligently feed, so shall you profitably reap, whether it be in dairying, hog raising, or growing everbearers.

THE everbearing strawberry that we are acquainted with today originated over 30 years ago from a single plant, a "sport," as botanists would term it, which Samuel Cooper in western New York found growing in his field of Bismarck, a then common June-bearing variety. Only this one plant among thousands of others had everbearing characteristics which persisted in the young runner plants. Mr. Cooper named his find the Pan-American. It was the first variety of our present everbearing strawberries. This new variety was then used in crossing with varieties in the June-bearing class to bring about other everbearing varieties. The first everbearing variety of any commercial importance was the Progressive, the result of a cross of the Pan-American and the Senator Dunlap, brought about by Harlow Rockhill in 1908 and introduced in 1912.

Since the introduction of the Progressive, other varieties have come to light, with varying degrees of success, such as the Superb, Americus, Peerless, Champion, and 999 Giant; but the most progress with everbearers has been made within the last six years with the introduction of the Mastodon, an everbearer that was originated by George Voer in Miami county, Indiana.

Mr. Voer crossed the Superb, an everbearer, with the Kellogg's Prize, a late June-bearing variety, saved the seeds from the berries which resulted from this cross and planted them. Only 17 seedling strawberry plants came up. All except seven of these died, and one plant out of those seven stood far ahead of the others. Because of its worthy characteristics, as compared with other known everbearers, this seedling was named Mastodon.

A picking of Mastodons after an autumn fall of snow.

Mr. Voer realized that he had a wonder in the strawberry family and kept the variety mostly to himself, but the secret finally leaked out when he gave and sold some of the "baby" Mastodons to his neighbors and friends. Soon after leading strawberry nurserymen offered the variety, and today it stands at the head of the list as the most prominent and universally-grown everbearing variety.

WHEN it is cared for and provided with plenty of food and moisture, the Mastodon produces a uniformly large berry from August until freezing weather. The production is also large, which places the variety in the commercial class, enabling growers to produce profitable crops during the late summer and fall months. The Mastodon also produces a profitable crop during the June strawberry season from plants that fruited all the summer and fall, and this crop is as large as any crop from the leading June-bearing varieties. This enables growers to harvest two crops of berries in a season.

Keep the Young Trees Vigorous

(From Page Seven)

Hence they are often referred to as "green manure" crops. As a result of this practice, organic matter will be incorporated into the soil where bacteria will utilize the carbon as a source of energy for release of additional nitrogen. Clean cultivation is usually maintained till the next crop is seeded in July or August. This practice will help to conserve soil moisture during the summer months, when it is most needed and very often insufficient.

Soils in many orchards perforce have to be kept in sod or a permanent cover crop as a protection against excessive erosion or to facilitate spraying and other orchard operations. In the making of a sod, leguminous plants, for instance some of the clovers, may be of great value. Permanent cover crops, as a rule, should not be cut for hay, but mulched.

Nitrogenous Fertilizers May Be Needed

ON MOST soils apple trees, especially when bearing heavily, cannot be maintained in a vigorous condition by cover cropping, unless it be very successfully managed. It is almost impossible on the poorer soils with a thick sod of grass. Nitrogen is commonly the limiting factor in such orchards, while phosphorus may be beneficial for certain soils to maintain a good cover crop.

Of the many nitrogenous fertilizers on the market, nitrate of soda and sulphate of ammonia have gained the greatest popularity. Under ordinary circumstances there is no choice between the two. It should be remembered, however, that nitrate of soda contains about 15 per cent nitrogen and sulphate of ammonia 20 per cent. Therefore, only three-fourths as much of sulphate as nitrate should be used. There is some evidence that the sulphate is somewhat slower in its action than the nitrate and hence it should be applied a few days earlier. For soils that are strongly acid, nitrate of soda should be used, but when lime is applied to counteract acidity, sulphate of ammonia may be preferred. Many other forms of commercial fertilizers containing primarily nitrogen have been put on the market, such as calcium nitrate, calcium cyanamide, urea, calurea, Leunasaltpeter, etc., but their comparative value for the fertilization of fruit trees has not yet been definitely ascertained. Undoubtedly some of these synthetic products will be widely used by orchardists in the future.

Amount of Fertilizer to Apply

THE amount of fertilizer to be applied is determined by the condition of the tree. Young trees with sparse yellowish foliage and thin short branches may be just as much in need of nitrogen as older bearing trees. It will be a surprise to many a fruit grower who will try it how devitalized trees, say three to five years old, will respond to a spring application of three-fourths pound of nitrate of soda or half a pound of ammonium sulphate. Growth will be stimulated, the leaves will be larger and of a deep green color, and in general the trees will show a marked increase in vigor and will become hardier and more resistant to disease.

A word of caution may be in place here. Young trees before they have reached the bearing age should not be overstimulated with readily available nitrogenous fertilizers. This may delay their coming into bearing by overbalancing the relationship between the carbohydrate and nitrogen content in the tree. But once the tree has begun to bear good crops, there is much less danger of such an upset, for a large amount of nitrogen is required for the development of the fruit.

In most orchards the bearing apple trees will respond conspicuously to spring application of nitrogen. The amount to be used depends on the condition of the trees and their age. Devitalized trees naturally will require more nitrogen than those growing vigorously. Under most circumstances one-fourth pound of nitrate of soda or an equivalent amount of sulphate of ammonia for every year's age of the tree is about the right quantity. Thus the smaller, more backward trees, which need the most stimulation, will get their share, despite the fact that they may not bear quite so much fruit. The fertilizer is broadcast as far or a little farther than the reach of the branches. Care should be exercised not to throw it too close to the main stem.

Fertilizing Biennial Bearers

TO MAINTAIN vigor and productivity in apple trees that have acquired a biennial bearing habit, a somewhat different program may be advisable. If such trees are fertilized with nitrogen in the bearing or "on" year, then, as a result of the increased set, they will so exhaust themselves that they will not be able to recuperate during the ensuing "off" year. Protracted investigations at the Missouri Agricultural Experiment Station have shown that it is advisable to apply nitrogenous fertilizers to biennial bearing apples, like the York, in the spring and the fall of the off year only. This will help to preserve vigor and to some extent reduce the tendency to bear every alternate year. Biennial bearing trees that have become very devitalized because of age or orchard crowding will be still further stimulated by a moderately heavy pruning during the winter following a crop.

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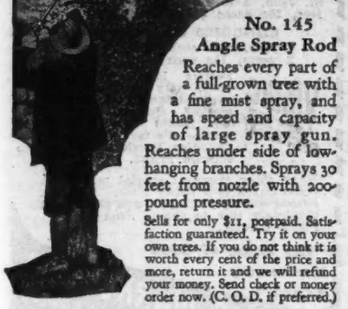

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Newer Raspberries

By GEORGE L. SLATE
New York State Experiment Station

THE RED RASPBERRY, perhaps more than any other fruit, has received the attention of plant breeders in recent years, and as a result of this attention, several noteworthy varieties have been developed. In fact, the varieties considered most satisfactory for general culture have all arisen as the result of an attempt to improve the fruit by systematic breeding. This breeding work has been inspired by the serious faults of the older varieties, and by the changing demands of both grower and consumer.

The consumer, as with other things, buys largely by eye, and a large, regular, bright red berry will sell more readily on the average market than a higher quality, but darker and less attractive berry.

The ravages of the dread mosaic disease have caused many growers to turn their attention to other fruits. At present, one of the first questions asked by growers about a new variety is whether it is resistant to mosaic. A variety very susceptible to mosaic will not long endure, even though noteworthy in other respects.

As labor becomes scarcer, pickers are becoming more particular and often object to picking a variety like Cuthbert with its prickles and with the fruit hidden in the foliage. A variety with smooth canes which bears its fruits out in the open is harvested much more rapidly and at a lower cost.

The following varieties, all of rather recent origin, have been thoroughly tested, and may be recommended for home use or for the market:

June, introduced in 1913 by the New York Agricultural Experiment Station, is an extra early sort, ripening two weeks before Latham and Cuthbert. Its fruit is large, firm, and a bright, attractive red. The berries do not crumble, and ship very well. In quality June is inferior to Cuthbert, but because of its superior size and appearance, it outsells that variety on the market. The plants are vigorous, healthy, and productive, and bear the fruit out in the open where it may be picked easily. The canes are thornless. The plants are moderately susceptible to mosaic, but the symptoms are very evident, and diseased plants may thus be easily rogued out.

Latham, introduced in 1912 by the Minnesota Experiment Station, is the most talked about raspberry in America today. If only one variety is to be grown for market, Latham is undoubtedly first choice. It has attained first rank by its ability to produce unusually heavy crops over a wide range of soil and climatic conditions. The plants are very hardy, do not easily become infected with mosaic, and when infected, resist the disease sufficiently to produce fair crops. The fruit is not high in quality, but the large size, firmness, and bright, attractive color more than compensate for the lack of quality. Latham comes into season two weeks later than June, and a planting of these two varieties will provide raspberries over a period of a month.

Newman, originating in Quebec about 1918, was introduced in this country in 1924. In fruit characters this is one of the best, the berries being very large, unusually firm, and of a bright, attractive red. The plants rival Latham in productiveness, but fall short of that variety in resistance to mosaic and adaptability to soils, seeming to prefer the heavier soil types. It is a variety every grower should try.

Viking, originating with the Ontario Horticultural Experiment Station at Vineland, Ontario, is now available from American nurseries. A seedling of Cuthbert, it surpasses that variety in all characters except quality, which, however, is good enough. The berries are large, a bright, attractive red, and because of the regular shape and small drupelets present a more attractive appearance in the basket than the varieties discussed above. The canes are thornless and bear the crop out in the open, making harvesting easy. Viking is confidently recommended for trial.

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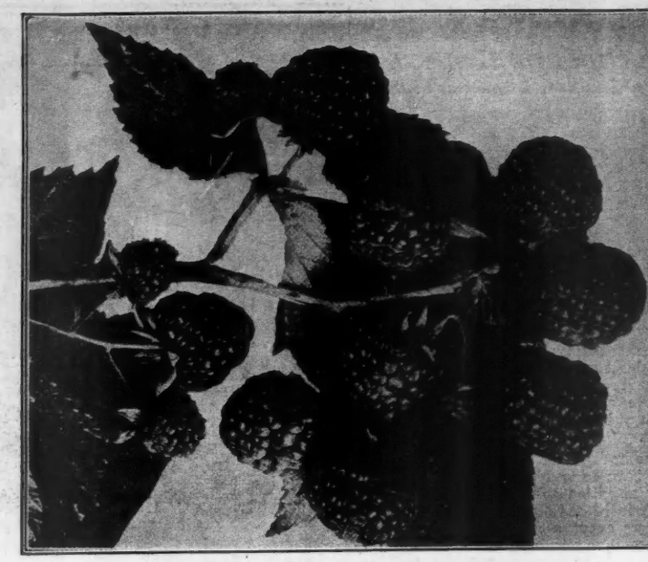

The Viking red raspberry (reduced).

The Viking Raspberry

THERE is a new red raspberry, the Viking, originated by Prof. F. S. Reeves of Southport, Prince Edward Island, Canada, that is creating quite an interest in raspberry culture. The various Canadian experimental farms—Central Experiment Farm, MacDonald College Farm, Vineland (Ont.) Horticultural Farm (where Professor Reeves originated the plant), and the Charlottetown Dominion Experiment Farm—have had trial plots of this berry growing and they believe it is the best raspberry so far introduced.

Professor Reeves has been growing this berry at Southport some nine years, though we, his neighbors, did not hear of it until recently. It seems Professor Reeves originated this variety while connected with the Horticultural Experiment Farm of the Province of Ontario, at Vineland, in the southwestern fruit area, about 12 years ago, and naturally left the credit of his creation to this farm. Since leaving Vineland and settling in Southport, he has been growing the berry and has succeeded in improving it until it is now practically disease-resistant.

A few Ontario nurserymen who are handling the Viking claim it is one of the vest varieties, if not the best variety. Professor Davis at the Central Farm, Ottawa, pronounces it as "one of the best four varieties out of more than 200 growing under test at the Farm." A communication from Professor Reeves reads in part as follows:

"I might say the Viking raspberry is a new creation of the Horticultural Experiment Station, Vineland, Ontario, and has proved quite the best raspberry in all eastern Canada and in the New England States. It has been under experimentation at Geneva, N. Y., where they pronounced it the best raspberry for their section, and it has been treated in a commercial way at MacDonald College, Quebec, by Professor Bunting, from whom I have received a report of actual results and his assurance that it is quite the best raspberry for their conditions."

Because the raspberry is so subject to disease, the growing of this fruit has been restricted. However, this new, practically disease-proof variety is bound to give a wonderful impetus to raspberry growing, not only on this island but all over Canada and in the States.—*J. A. McDonald, P. E. I., Canada.*

Improving Our Spray Equipment

(From Page Six)

over three and a third feet from the nozzle opening, while the nozzle used on the new head delivered a spray equally as fine but did not spread it into such a wide cone. This resulted in an effective drive three times greater than that produced by the old nozzles. The carrying power or effective drive of the spray is an important factor when considering spray equipment, because it is necessary for delivering the spray to the inner branches and distant parts of the tree.

New Nozzle Available to the Public

THREE types of nozzle heads were found most practicable but the four-nozzle arrangement is more generally used. The three-nozzle heads are used on machines which do not have sufficient capacity for the larger head. Because the nozzle heads can now be obtained from manufacturers of spray equipment, we will not give details of construction here. It is sufficient to say that the head should always be set at an angle on the rod. When this is done the weight of the rod and head is lifted from the operator while spraying. Some growers have failed to observe this simple rule, although most heads now available have an adjustable angle which can be set at will.

During the seasons of 1926 and 1927 the nozzle heads were made by a number of local growers. All of these heads were made from gas pipe fittings and were considerably heavier than the commercial form now available. Among others, the Byrd brothers adopted this home-made equipment for all of their orchards, beginning in 1926. At the close of the 1927 season, manufacturers of spray equipment became interested in the results of the performance of this type of spraying device and now it is available to the public.

Amounts of Spray Delivered

AT 300 pounds pressure a four-nozzle head will deliver the following amounts of spray: one-sixteenth inch spray disk openings, four gallons; one-twelfth inch disks, six gallons; one-tenth inch disks, eight gallons per minute. A three-nozzle head will deliver approximately one-fourth less, and the effective drive is about 12 feet compared to 15 feet for the four-nozzle arrangement. The spray delivered by the nozzle-head is more finely divided than that usually delivered by the gun and carries equally as far, except when the gun is opened to throw a stream of liquid.

The length of the rod suitable for work on top of the tank or tower will depend on the average height of the trees to be sprayed. Usually a six-foot rod is sufficient for reaching the tops of trees 20 to 25 feet high. For the man spraying the lower half of the tree from the ground, a four-foot rod is generally used.

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BRIDGE GRAFTING

(*From Page 13*)

set a single scion on the higher side of the stub. This treatment will permit the stub to heal readily. To protect the new tree, a stake should be set close by to which it can be tied later in the season to prevent it from being broken out by strong winds.

Occasionally some growers merely saw off the tree below the girdle, dispense with grafting, and take a chance on a sprout developing above the original bud or graft which is used for a new trunk. This procedure is not advised, as the stub above the sprout heals slowly. Grafting the stub is the better way; growth is surer, faster, and the stub is healed.

If trees are one and three-fourths inches or more in diameter, bridge grafting is the best treatment. Bridge grafting merely consists of connecting with a scion the cambium layers at the top and bottom of a girdled area so that growth may be resumed and the normal functions of the tree restored.

Material Needed

TO DO this work, a very sharp knife is needed, together with some small nails or brads (five-eighths inch in length), a tack hammer, either brush or hand wax, and a bundle of dormant scions. The chances of success are materially decreased if the buds on the scions have started.

A girdled eight-year-old Stayman Winesap that is entirely supported by bridge grafts.

There are several ways in which bridge grafting may be accomplished, each one of which will give good results if properly done.

Grafting Thick Barked Trees

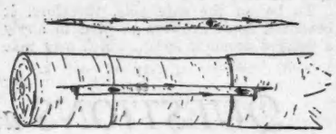
TO BRIDGE graft girdled trees that have very thick bark, the inlay or channel graft as illustrated by method A is preferred. The scion for the inlay graft is prepared by cutting the scion stick to the required length. Each end is then reduced to about one-half its original thickness by a bevel cut two or three inches long. The base end of the prepared scion is then held against the spot it is to occupy and its position outlined with the point of the knife. Lay the scion aside and with the knife remove the bark just outlined. If any bark is left in the bottom of the channel, it will prevent the very necessary contact between the cambium layers of the scion and stock. The scion is then inserted in the channel and nailed to assure close contact. The process is repeated at the other end. Other scion bridges should then be inserted every two or two and one-half inches around the girdled portion.

Method A.

Waxing

WHEN the job is completed, the scions should be carefully waxed over to prevent drying out. Be careful to secure tight sealing in the angle between the tree and the upper end of the scion. If brush wax is used, the edges of the girdled area can also be covered. Painting the girdled area itself with a thin layer of brush wax will not only protect it from wood rotting fungi but keep the sapwood from drying out.

Another method which works very satisfactorily on young trees where the bark is thinner is illustrated by method B. The scion is beveled at each end, principally on the side which is set against the tree; the other or back side of the scion is beveled slightly to present a wedge shaped appearance at each end.



Method B.

The ends of the scion are inserted by making an L-shaped cut in the bark. The point of the knife is then inserted at the corner of the L and the bark lifted sufficiently to allow the insertion of the prepared scion, which is then nailed in place. Scions on young trees should be sprung slightly when set so they will not be broken out when the tree sways in the wind.

Many modifications of these two methods are often employed, but the principle of close contact between the cambium layers of the scion and stock are always the same.

The Trend Toward Red Bud Sports

(*From Page Five*)

a sport arises and shows an increase of color only, there is rarely a danger of an undesirable character showing up at the same time, but this is not always true. From the standpoint of color alone, some red strains tend to be black or dull rather than of a more attractive bright or rich red shade. The best strain of a variety should, if possible, be the one to propagate and plant.

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THE value of redder strains of apples is largely based on the fact that most buyers and consumers demand that a red apple be *red* and they pay for such fruit accordingly. Although apples of such a strain grade nearly 100 per cent extra fancy or No. 1 from a color standpoint, yet there are other advantages even more far reaching. Additional color nearly always is accompanied by better eating and keeping qualities. Fruits of such strains may also be picked in accordance with their correct ripeness, without waiting for the required amount of color at the expense of quality.

In many sections of the United States, particularly in the more humid climates and at lower elevations, a red strain is almost a necessity in securing sufficient color in a red variety of apple. There are a few districts, however, particularly where cold nights are common, where sufficient color may be produced without the aid of red strains, except perhaps in unfavorable seasons.

The future position of the bud sport and particularly the red strain in the fruit industry can probably not be fully prophesied at the present time, but it is fairly safe to look forward to a greatly increased use of this valuable asset which nature has so freely given.

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QUESTIONS & COMMENT

(*From Page* 11)

bark is replaced, however, the better. If the bark is replaced firmly against the wood and bound, the extension of the injury is prevented. The dead bark may be removed later and the wounds disinfected with Bordeaux; after which it is usually well to paint the area with grafting wax, paraffin, or ordinary house or barn paint.

Several different methods of binding the bark to the wood may be employed. Some of the most important consist of tying it in place with twine or strips of burlap. Long, large-headed carpet tacks or roofing nails about one and one-fourth to one and one-half inches in length may be used in fastening the bark to the wood, providing care is taken to prevent bruising the bark in driving the tacks or nails. The nails if driven into the bark about five to eight inches apart will usually hold it firmly in position against the wood. It is important to prevent injury that the head of the nail be driven no deeper than just even with the outer bark.

All splits, cracks and wounds should be covered thoroughly with grafting wax or paraffin to prevent drying out. The commercial preparation known as Parawax is very satisfactory for this work.

Two Scab Sprays Before Blooming

SINCE APPLE SCAB was more serious in 1929 than in any year of which we have a definite record, the disease is more likely to do greater injury this year than usual. If the season is such as experienced in 1929, it is certain that we will have a recurrence of the scab malady.

To be on the safe side, therefore, it behooves apple growers to plan to apply a delayed dormant spray, which may take the place of the regular dormant spray for the control of San Jose scale. If applied at the time when the leaves are about one-eighth of an inch long and the aphid eggs are hatching, it may consist of oil emulsion one and one-half gallons in Bordeaux 2-4-50, which will be effective against both scale and aphides as well as apple scab. If one pound of lead arsenate is added, the spray will also combat curculio, canker worm, and other biting and chewing insects.

Following this application, the grower should apply the regular cluster bud spray, consisting of lime-sulphur one and one-fourth to 50, plus one pound arsenate of lead. These two early applications before blooming are needed where scab is likely to be serious. This is true because if scab is serious, one spray made at about the cluster bud period will not control the malady, and as a result the disease may cause a heavy drop of fruit as well as foliage.

Following the cluster bud spray, of course, the calyx application, also an important scab spray, should be made. For this spray the same materials at the same dilution may be used as for the cluster bud spray. After the calyx spray the grower should plan to spray at intervals of from 12 to 14 days up until within about five or six weeks of harvest time.

For these cover sprays following the calyx application, a wide variety of spraying chemicals may be used, depending upon the severity or prevalence of insects and diseases. Where apple blotch is a factor to control, Bordeaux 2-4-100 should be substituted for lime-sulphur. Where neither scab nor blotch is serious, dry lime-sulphur or atomic sulphur, or some other specially prepared spraying chemicals may be used instead of liquid lime-sulphur or Bordeaux. It is important to use arsenate of lead at the rate of one pound to 50 gallons with all fungicides, to control codling moth and other biting and chewing insects.

QUESTIONS and ANSWERS

To give practical and helpful answers to a great variety of questions dealing with cultural practices of fruits from all parts of the United States, it is necessary in some instances to treat the questions in a more or less general manner. For this reason it is suggested that, where more specific and definite information as applied to local conditions is desired, inquiry be made to the county agent or the State experiment station.

No Injury to Trees From Oil Sprays

The experiment stations advise us not to use any oil sprays for fruit trees as they have not found out as yet whether these sprays injure the trees.

Last year the different aphides were our greatest pest. Instead of oil, would you advise us to use whale oil soap and tobacco with the lime-sulphur delayed dormant spray? For summer aphides, is it safe to use whale oil soap with Bordeaux? For general information, would you please state what spray materials can be used in combination.—*W. B., Missouri.*

THE MISSOURI Agricultural Experiment Station at Columbia has used lubricating oil sprays made by the government formula and known as boiled oil emulsion, has developed and used the so-called cold-mix oil emulsion, and has also used many proprietary brands of oil emulsion prepared by standard chemical concerns, all of which have proved satisfactory in the control of scale insects on deciduous fruit trees in the State.

Moreover, experimental work for seven years has not as yet caused injury to fruit trees when used at recommended dilutions, which are usually one and one-half to two gallons of the stock emulsion to 50 gallons of water.

The Missouri station has, therefore, recommended the use of oil emulsions, either home-made or that made by commercial concerns and offered for sale, believing that, if the oil emulsion is used with care and judgment, there is no material danger of doing injury to deciduous fruit trees. The main precaution for the grower to take is to note whether or not a good emulsion is being obtained during the spraying operations. Since Bordeaux mixture is a good emulsifier and also a powerful fungicide, it is suggested that growers use the oil emulsion in Bordeaux made according to the 2-4-50 formula, and, if the oil Bordeaux is applied just as the green tips of the buds are showing in the spring, the combination spray will be found to be effective against apple aphides, San Jose scale, and apple scab, as well as other orchard pests.

In case aphides seem numerous enough during the late spring and summer to justify spraying for control, you may use whale oil soap at the rate of one to two pounds after being dissolved in 2-4-50 Bordeaux with arsenate of lead, to which is added one-half pint of nicotine sulphate. This should be a very effective summer spray for aphides and it should not do material injury to foliage or fruit. The nicotine sulphate may also be used with lime-sulphur at the rate of about one-half pint to 50 gallons.

Norway Spruce and Balsam Do Not Spread Disease

I have several acres of apples, cherries, peaches, etc. I also have a small plantation of Norway spruce and balsam. Will the evergreens spread diseases to the fruit trees which cannot be controlled?—*J. H. B., New York.*

SO FAR as is known, the red cedar and closely related species are the only evergreens that are susceptible to injury and carry over winter the so-called cedar rust fungus. The planting, therefore, of the Norway spruce and balsam near your fruit trees should not in any way, so far as the rust is concerned, do the orchard injury.

Limestone in Orchards

Would it be advisable to put fine limestone around newly planted fruit trees? The soil is mainly red clay.—*H. S. M., Ohio.*

WHILE an application of fine limestone placed around young fruit trees would perhaps do no harm, in all likelihood no benefit would be received

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TREE PROTECTOR
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from such treatment. This is true because apple trees will generally thrive in a more or less acid soil. Applications of barnyard manure placed around your young trees and worked thoroughly into the soil by plowing or hoeing is much more likely to give the results desired.

In this connection, it is worth while to understand that an application of limestone at the rate of three or four tons per acre will frequently cause red clover to grow or some other leguminous crop to thrive. When this is done, nitrogen is stored in the soil through the bacteria on the roots of the leguminous plants. In this way the nitrogen and humus content of the soil is increased. Moreover, the soil is better aerated, and as a result of the growing of legumes through the use of limestone, the trees are benefited. Limestone, therefore, indirectly benefits the orchard when applied to the soil.

Perpetuating an Apple Variety

We have a remnant of a Fall Wine apple tree from which we desire to propagate new trees. The tree was nearly destroyed in a windstorm. There is a small portion of it attached to the roots which is still alive. What kind and what age trees should we purchase, and should we bud or graft? We do not find such an apple as this delicious Fall Wine in any nursery stock. Any information you will give us about grafting or budding the trees will be greatly appreciated, as we are amateurs at this work.—*N. M., *Kansas.*

THERE ARE perhaps two methods that you may employ profitably in perpetuating the Fall Wine apple which you describe.

You may cut scions and root graft by the so-called whip and tongue grafting method, planting out the grafts in the spring and cultivating them as nurserymen do that make such work a regular practice. For whip and tongue grafting you may secure from one of your Kansas nurseries a sufficient supply of seedling apple roots for your needs.

The second method, a quicker one in securing fruit, would be to cleft graft some young apple trees now growing on your farm. The regular cleft graft method should be employed, and if the trees so cleft grafted or top-worked are now of bearing age, you should procure some fruit perhaps when the grafts are three years old and almost a full crop when the top-worked trees are four years of age.

Lessening Waste Water in Irrigating

I have five acres of good rich land, almost level. When I use surface irrigation it takes too much water. Do you know of a system of laying cement tile 16 inches under the surface, the line, say, 10 to 12 feet apart? By turning well water into these tile, could I successfully get the water to the roots of plants with less water? Kindly give me your opinion of sub-irrigation as compared with surface irrigation.—*F. D. S., *Oklahoma.*

THE STUDY of your question leads me to believe that your main problem is to lessen the waste of water in the practice of irrigation. Losses of water may in general be prevented by improving or lessening the waste through the following:

1. Loss by absorption and seepage. Where water is scarce, the supply ditch should be made as nearly water tight as possible. This is frequently done by lining the ditch or channel with cement concrete, cement plaster, asphalt, heavy crude oil, or even clay puddle. As a substitute for earthen ditches, flumes or pipes may also be used.

2. Loss from faulty preparation of surface soil. If the surface soil between field laterals is evenly graded, the water will flow in a thin sheet over the entire surface and the excess water may be caught by the lower lateral.

3. Loss from neglect. The chief loss in some instances is due to a lack of attendance. This may occur where the water is permitted to run without attention for hours or even days. With such practice low places are likely to receive too much water and high places too little; while a large portion of water may flow off and do injury to roads or joining farms.

4. Loss through inefficient irrigation. Another source of waste may be caused by two frequent and too shallow irrigation; however, it must be remembered that light, open soils retain less moisture, and under such conditions irrigation is

+

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Oil Emulsion for Citrus Insects

I am writing concerning a citrus spray. I have an apple orchard here and an orange grove in Cuba. What I want is an effective spray for purple scale, also San Jose scale, on orange trees. We also have aphis on the leaves of small trees. Do you think an oil spray would hit them both? If so, what kind of oil and what formula. Any information you can give me would be much appreciated.—*R. W. B., Massachusetts.*

THE CONTROL of scale insects and white flies is generally considered a single problem, as the control measures are the same. The general method of controlling these pests consists of the use of oil emulsion sprays. For your location, perhaps the best time for making the application would be during late September or early October. Since the application of oil sprays to citrus trees tends to delay the ripening of the fruit, it would not be advisable to apply fall sprays to early ripening sorts. For the early ripening varieties the spray might be delayed until after harvest.

Cold-mix or boiled oil emulsion made according to standard formulas may be used. The usual dilution is from one to one and one-half gallons to 50 gallons of water. Moreover, oil emulsion may be purchased from commercial concerns engaged in the manufacture of the product, in which case dilutions should be made according to recommendations of the manufacturers.

The Use of Dusts on Deciduous Fruit Trees

I would like a little more information in regard to the dusting mixture mentioned in the article, "Rotting of Plums," on page 12 of the January issue. Will this dust give good results in the control of shot hole fungus or leaf dropping of cherries? If so, where can I obtain the superfine sulphur and can I mix the materials myself? What information can you give me on dusting? It is something new in this part. What is the correct mixture for boiling arsenic poison and lime for use in spraying fruit trees? I used this spray years ago with good results but have forgotten the formula.—*P. H. L., Michigan.*

DUSTS of various kinds are frequently used for the control of diseases and insects on deciduous fruit trees instead of sprays. Most experiment stations, however, have found that where diseases and insects, one or both, are serious, better results are usually obtained through the use of sprays.

There are advantages in using both dusts and sprays, and when each is weighed and considered, there is not much difference between them. It is suggested therefore, if you desire to use dusts in your orchard under the particular conditions common to your section of the State, that you write to your State experiment station for literature on both spraying and dusting.

Nearly any of the commercial concerns handling spraying chemicals can also supply dust materials, both mixed and unmixed.

We are unable to give directions for the treatment of arsenic by boiling in preparation for the spraying of fruit trees, since it is not necessary at this time to treat arsenic as we did in earlier times. It is doubtful whether such materials which were formerly worth while would now be as good as our standard arsenate of lead, which is used universally in spraying orchard trees to control insects.

Habits and Control of Apple Maggot

Will you kindly give me information on the habits and control of the apple maggot or railroad worm. I think they are the same.—*M. N. D., Indiana.*

IT IS TRUE that the apple maggot (*Rhagoletis pomonella* Walsh) is also known as the "railroad worm."

In the northeastern States particularly this insect is very injurious to apples. The adult is a two-winged fly and it appears in July, laying eggs beneath the skin of the apples. The maggots feed in the pulp, completing their growth usually after the apple has fallen to the ground. The maggot bores into the soil, pupates and remains until the following July.

Since the maggots feed beneath the skin of the apple, they cannot be killed by spraying. Control, therefore, consists in keeping dropped fruit picked up at least twice a week. Livestock such as hogs may be turned into the orchard at intervals to eat the apples as they drop. Chickens may also destroy many of the larvae and pupae in the soil. Cultivation throughout the summer may also tend to destroy the pest.

Peach and Grape Fertilization

I have a peach orchard of 350 trees ranging in age from two to five years. The soil is thin. Could you advise me what is the best commercial fertilizer to enrich the soil? Also for grapevines of the same age.—O. G. C., Pennsylvania.

FOR YOUR peach trees, it is suggested that barnyard manure be used, if obtainable, at the rate of from 10 to 15 tons to the acre.

If this cannot be secured, peach trees should be fertilized with nitrate of soda or sulphate of ammonia at the rate of about one and one-half pounds for two-year-old trees and three pounds for five-year-old trees. It is suggested that the fertilizer be spread broadcast about the trees under the spread of branches about 10 days or two weeks before blooming time.

Young grape vines, as a rule, do not respond favorably to applications of barnyard manure or commercial fertilizers. The grower, as a rule, should not resort to fertilization until other methods, such as good cultivation, proper pruning and spraying have failed to give the response in growth desired. If, therefore, the grape vines, after being well cultivated, pruned and sprayed, fail to grow properly, then it is well to resort to fertilization, using barnyard manure, if obtainable, at the rate of 10 to 15 tons to the acre, or if this cannot be secured, use nitrate of soda or sulphate of ammonia at the rate of 250 to 350 pounds to the acre, applied in the spring just about the time growth starts.

The Use of Dynamite in Tree Planting

Which is best, dynamite or black powder, for blasting holes in which apple trees are to be set? About what part or how much of a stick of dynamite is required per hole to do a good job on the average soil, using 40 or 60 per cent dynamite? About what is the cost of dynamite now?

I have been told that it is a good plan to put scrap iron in the soil around apple trees so as to make up for the iron taken by the tree. Is this a good plan and has it been tried by fruit growers?

Which of the two apple trees would be best for Maine, the McIntosh or the Cortland?—*O. N., Maine.*

IN GENERAL dynamite is more satisfactory for blasting holes in the soil for the planting of fruit trees than black powder. Aglitol, a new kind of dynamite, is generally considered better than the old kind. Dynamite usually retails for about $12 a case, and a case contains 100 sticks.

The use of dynamite in making tree holes and to shatter and loosen the soil has been investigated by many stations. In general the practice has not resulted in any advantage to the trees. This has held true in tight, impervious subsoils known as hardpan and in looser and more friable soils. In clay subsoils, a little wet at time of dynamiting, distinct harm may be done by plastering the clay together in such a way as to form a cavity or pocket which may not allow good water drainage. In such instances trees are often killed due to a lack of proper drainage in wet weather. The soil and subsoil should always be dry enough to work properly before dynamiting. Tight, impervious soils which are said to require dynamiting are generally unsuited for an orchard. What is most needed in the preparation of land for an orchard is thorough, deep plowing and tillage, such as is given the soil in preparing it for a good truck crop or grain crop.

The placing of scrap iron, iron filings, etc., in the soil about the roots of the fruit trees will have little or no effect on the vigor and fruitfulness of the trees. Such practices are discouraged.

As to whether or not you should plant the McIntosh variety of apple or the Cortland variety in your section of the State, it is suggested that you write to your experiment station, Department of Horticulture, Orono, Me. The station should be in a better position to advise you regarding this than any other source.

Horticultural Problems Discussed at West Virginia Meeting

THE WEEK of February 10 to 15 was a red letter week for orchardists in West Virginia. The entire week was given over to public study of horticultural problems, open discussions of practices and the laying of plans for the future of the industry in that State.

During the first part of the week the Horticultural School was held in the immense Community Packing House at Inwood, in Berkeley county. More than 200 persons, consisting of orchard owners and managers, were in attendance. The main discussions were on new developments in fruit and fruit growing; sterile varieties of apples, of which there are so many in the Shenandoah-Cumberland district; and the production of quality fruit through a number of means, including spray equipment and thinning. Considerable attention was given to sour cherries, which is a fruit that is being planted more heavily each year in the eastern section of the State.

On Thursday the West Virginia Horticultural Society opened its annual meeting in Martinsburg. A crowded program had been arranged. Nationally-known fruit experts talked on new and timely topics. Discussions of West Virginia's own problems in fruit growing by those who are specialists and authorities, and discussions by the growers themselves were held.

Among the principal speakers were Dr. J. R. Magness, principal pomologist, United States Department of Agriculture; Dr. E. C. Auchter, United States Bureau of Plant Industry; Dr. C. R. Orton, West Virginia's new pathologist; M. A. Blake, New Jersey State specialist in plant pathology; W. S. Hough of Winchester, Va., one of the outstanding spray men of the United States; and John W. Smith, Commissioner of Agriculture in West Virginia.

Fruit growers from all sections of the Shenandoah-Cumberland district, including Pennsylvania, Maryland and Virginia, were present and it is believed that this meeting was one of the best in the history of the society.—*T. R. Butts, Pennsylvania.*

Fresh Fruit Exports Increase

THE INCREASING popularity of fresh fruit throughout the world is indicated in a comprehensive analysis of foreign trade just issued by the Commerce Department. This study, which was made by D. J. Moriarty of the Foodstuffs Division, shows that during the five-year period from 1923 to 1927, the value of fresh fruit shipments from this country almost doubled, rising from $33,000,000 to $60,000,000. In 1928 there was a decline of approximately $4,000,000 in this trade, due to short apple and citrus fruit crops in 1927 and an accelerated domestic demand.

Apples, as might be expected, account for the bulk of our fresh fruit export trade, having a value of $27,000,000 in 1928, while oranges followed with a value of $14,000,000. The United States is by far the world's chief exporter of apples, while the United Kingdom is the leading importer. Of the 1,829,000 barrels shipped from the United States in 1928, British importers took more than 60 per cent, while the same interests bought 43 per cent of the 8,149,000 boxes exported from this country. Other important foreign markets for American apples include Germany, Netherlands, Canada, Argentina, Brazil, Sweden, Denmark, Philippine Islands and Mexico.

The principal competition which American apples have to meet in British markets, the survey points out, comes from Canadian fruit which is exported from October to March, the same period when United States apples move in heaviest volume. Aside from this competition, American apples have to meet the competition of Spanish oranges which arrive in the United Kingdom during this period.

While Spain is the largest exporter of oranges, shipments abroad of this fruit from the United States have been steadily rising. As in the case of apples, exports were lower in 1928 than during the preceding year. Canada has been our chief export market for several years, taking in 1928 about 85 per cent of the 2,677,000 boxes shipped.

Referring to grapefruit, the survey shows that the popularity of this typically American fruit is growing steadily in the United Kingdom, aided to a considerable extent by the "Eat more fruit" campaign being conducted by British importers. Of the 679,000 boxes of grapefruit valued at $2,900,000 exported from the United States in 1928, nearly 60 per cent went to the United Kingdom. Canada is also an important outlet, taking 38 per cent in the same year. Approximately one-third of United States grapefruit exports, according to the survey, originate in Porto Rico, being transshipped from New York.

Besides apples, oranges and grapefruit, the survey shows that exports of other fruits during 1928 were valued as follows: Pears, $4,100,000; grapes, $2,500,000; berries, $1,430,000; lemons, $1,430,000; peaches, $730,000; and pineapples, $146,000.

Georgia Planning Apple Blossom Festival

NORTH GEORGIA apple growers will stage an apple blossom festival in the spring that will eclipse anything of its kind yet seen in this part of the country, if proposals for the celebration, which have just been submitted, are carried out.

J. Frank Beck, Atlanta business man and apple grower, is the originator of the plan. Mr. Beck, a former president of the Consolidated Apple Growers' Exchange at Cornelia, believes the celebration will attract attention to the State's apple industry to a greater extent than has been the case in a number of years. The growers' exchange, which is headed by Dr. S. T. Barnett, of Atlanta, as president, and J. C. Porter, secretary-treasurer and resident manager at Cornelia, is expected to sponsor the event.

Tentative plans provide for the building of floats, suggestive of historic periods in the growth of the apple, by various communities in Habersham county, the apple belt of the State. All educational institutions, clubs and societies will participate. A king and queen, with attendants, to lead a pageant, one of the big features of the festival, will be elected by popular vote.

The proposed celebration will be the first of its kind on a large scale. A few seasons ago an apple blossom festival was held at Cornelia as an indoor affair, due to inclement weather. The 1930 show, if plans are carried out, will be similar to the Mardi Gras at New Orleans and will attract visitors from all parts of the South.

Details of the celebration will probably be discussed at the annual meeting of the growers' exchange.—*Frank C. Gilreath, Georgia.*

An agricultural production and marketing program for the State of Connecticut was formulated at the Sixtieth Annual Union Agricultural Meeting which was held February 5 at Hartford, Conn. The program is organized by commodity groups: dairy, fruit, poultry, potatoes, tobacco, and vegetables.

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